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May 1977 Number 393-Part I

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# Solar-Geophysical Data prompt reports

Data for April 1977–March 1977

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977

ERRATA PAGE 22

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / ASHEVILLE, N.C.

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# Solar - Geophysical Data

NO. 393 MAY 1977

## Part I (Prompt Reports)

DATA FOR
APRIL 1977
MARCH 1977

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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# SOLAR - GEOPHYSICAL DATA

No. 393

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

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Note: A = Part I, B = Part II.

386A 22 listed under 1976 Aug shows that data for August 1976 were contained in *Solar-Geophysical Data* Number 386 - Part I beginning on page 22.

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# ALERT PERIODS

## INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

### APRIL 1977

SUMMARY OF THE GEOALERT WWA MESSAGES

| Message serial number | Date of issue | Date of observation | Wolf number | 10 cm solar flux | A index | Active Regions | No. of Flares | | | Outstanding events | Forecasts | | | Alert Situations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Location Lat-Long | Total | M | X | | Date | Location Lat-Long | Desc* | |
| 91 | 1 | 31 | 13 | 74 | 03 | N23E01 | 0 | 0 | 0 | | 1 | N23E01 | Q | SOLQUIET MAGQUIET |
| 92 | 2 | 01 | 12 | 75 | 03 | N24W10 | 0 | 0 | 0 | | 2 | N24W10 | Q | SOLQUIET MAGQUIET |
| 93 | 3 | 02 | 15 | 76 | 03 | N25W27 | 0 | 0 | 0 | | 3 | N25W27 | Q | SOLQUIET MAGQUIET |
| 94 | 4 | 03 | 13 | 77 | 09 | N24W38 | 0 | 0 | 0 | | 4 | N24W38 | Q | SOLQUIET MAGALERT 04 |
| 95 | 5 | 04 | 11 | 77 | 20 | N26W55 | 0 | 0 | 0 | | 5 | N26W55 | Q | SOLQUIET MAGALERT MINOR 05/06 |
| 96 | 6 | 05 | 12 | 75 | 10 | N19W55 | 0 | 0 | 0 | | 6 | N19W55 | Q | SOLQUIET MAGALERT MINOR 06/07 |
| 97 | 7 | 06 | 12 | 76 | 22 | N18W69 | 0 | 0 | 0 | | 7 | N18W69 | Q | SOLQUIET MAGALERT 07/09 |
| 98 | 8 | 07 | 00 | 77 | 40 | - | - | - | - | | 8 | SPOTNIL | | SOLQUIET MAGALERT 08/09 |
| 99 | 9 | 08 | 11 | 74 | 29 | N29W28 | 0 | 0 | 0 | | 9 | N29W28 | Q | SOLQUIET MAGALERT 09/10 |
| 100 | 10 | 09 | 00 | 75 | 25 | - | - | - | - | | 10 | SPOTNIL | | SOLQUIET MAGALERT |
| 101 | 11 | 10 | 00 | 76 | 14 | - | - | - | - | | 11 | SPOTNIL | | SOLQUIET MAGNIL |
| 102 | 12 | 11 | 13 | 79 | 08 | S21E78 | 0 | 0 | 0 | | 12 | S21E78 | Q | SOLQUIET MAGQUIET |
| 103 | 13 | 12 | 26 | 80 | 06 | N26W48<br>S20E67 | 0<br>0 | 0<br>0 | 0<br>0 | | 13 | N26W48<br>S20E67 | Q<br>E | SOLALERT MINOR MAGQUIET |
| 104 | 14 | 13 | 26 | 82 | 05 | N27W61<br>S20E54 | 0<br>5 | 0<br>1 | 0<br>0 | | 14 | N27W61<br>S20E54 | Q<br>E | SOLALERT 14/18 MAGQUIET |
| 105 | 15 | 14 | 29 | 83 | 09 | N27W74<br>S20E41 | 0<br>1 | 0<br>1 | 0<br>0 | | 15 | N27W74<br>S20E41 | Q<br>E | SOLALERT 15/18 MAGQUIET |
| 106 | 16 | 15 | 57 | 86 | 10 | S20E28<br>S25W06<br>N20W69 | 6<br>0<br>0 | 0<br>0<br>0 | 0<br>0<br>0 | | 16 | S20E28<br>S25W06<br>N20W69 | E<br>Q<br>Q | SOLALERT 16/19 MAGQUIET |
| 107 | 17 | 16 | 55 | 83 | 10 | S19E14<br>S24W20<br>N26W08 | 5<br>0<br>0 | 1<br>0<br>0 | 0<br>0<br>0 | | 17 | S19E14<br>S24W20<br>N26W08 | E<br>Q<br>Q | SOLALERT 17/19 MAGQUIET |
| 108 | 18 | 17 | 43 | 83 | 09 | S20E05 | 3 | 0 | 0 | | 18 | S20E05 | A | SOLALERT 18/19 MAGQUIET |
| 109 | 19 | 18 | 34 | 80 | 09 | S20W09<br>S26W47 | 1<br>0 | 0<br>0 | 0<br>0 | | 19 | S20W09<br>S26W47 | A<br>Q | SOLALERT MINOR 19 MAGQUIET |
| 110 | 20 | 19 | 29 | 82 | 32 | S20W20<br>S25W71 | 2<br>0 | 0<br>0 | 0<br>0 | A MINOR GEOMAGNETIC STORM IN PROGRESS | 20 | S20W20<br>S25W71 | A<br>Q | SOLALERT 20 MAGALERT MINOR 20/21 |
| 111 | 21 | 20 | 14 | 83 | 20 | S20W36 | 2 | 0 | 0 | | 21 | S20W36 | Q | SOLNIL MAGALERT 21 |
| 112 | 22 | 21 | 17 | 80 | 10 | S19W42 | 5 | 0 | 0 | | 22 | S19W42 | A | SOLQUIET MAGNIL |
| 113 | 23 | 22 | 29 | 79 | 06 | S22W56<br>S13W00 | 0<br>0 | 0<br>0 | 0<br>0 | | 23 | S22W56<br>S13W00 | A<br>Q | SOLQUIET MAGQUIET |
| 114 | 24 | 23 | 20 | 77 | 06 | S21W70 | 0 | 0 | 0 | | 24 | S21W70 | Q | SOLQUIET MAGQUIET |
| 115 | 25 | 24 | 12 | 76 | 06 | S21W83 | 0 | 0 | 0 | | 25 | S21W83 | Q | SOLQUIET MAGQUIET |
| 116 | 26 | 25 | 00 | 76 | 22 | - | - | - | - | | 26 | SPOTNIL | | SOLQUIET MAGQUIET |
| 117 | 27 | 26 | 11 | 74 | 05 | S22E69 | 0 | 0 | 0 | | 27 | S22E69 | Q | SOLQUIET MAGQUIET |
| 118 | 28 | 27 | 12 | 74 | 03 | S22E56 | 0 | 0 | 0 | | 28 | S22E56 | Q | SOLQUIET MAGQUIET |
| 119 | 29 | 28 | 12 | 73 | 03 | S21E43 | 0 | 0 | 0 | | 29 | S21E43 | Q | SOLQUIET MAGQUIET |
| 120 | 30 | 29 | 13 | 74 | 16 | S19E30 | 0 | 0 | 0 | | 30 | S19E30 | Q | SOLQUIET MAGALERT 30/02 |
| 121 | 01 | 30 | 13 | 76 | 08 | S19E17 | 0 | 0 | 0 | | 01 | S19E17 | Q | SOLQUIET MAGALERT 01/06 |

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

# RELATIVE SUNSPOT NUMBERS

## ZURICH, $R_Z$

| | 1976 FINAL | | | | | | | | 1977 PROVISIONAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR |
| 1 | 30 | 0 | 9 | 10 | 17 | 30 | 0 | 0 | 20 | 15 | 0 | 7 |
| 2 | 23 | 0 | 8 | 16 | 20 | 28 | 0 | 0 | 32 | 11 | 8 | 11 |
| 3 | 25 | 0 | 10 | 17 | 12 | 30 | 0 | 0 | 25 | 19 | 8 | 10 |
| 4 | 8 | 0 | 8 | 13 | 11 | 30 | 0 | 0 | 22 | 15 | 8 | 7 |
| 5 | 21 | 0 | 8 | 16 | 17 | 25 | 0 | 0 | 21 | 10 | 8 | 7 |
| 6 | 10 | 0 | 10 | 14 | 10 | 24 | 0 | 0 | 13 | 7 | 9 | 8 |
| 7 | 16 | 0 | 7 | 24 | 9 | 30 | 0 | 7 | 0 | 7 | 8 | 7 |
| 8 | 9 | 10 | 0 | 27 | 9 | 7 | 0 | 19 | 0 | 26 | 20 | 0 |
| 9 | 8 | 10 | 0 | 31 | 18 | 14 | 0 | 22 | 0 | 21 | 20 | 0 |
| 10 | 10 | 7 | 0 | 24 | 22 | 0 | 0 | 19 | 0 | 23 | 19 | 0 |
| 11 | 16 | 7 | 0 | 23 | 24 | 0 | 0 | 22 | 14 | 25 | 19 | 0 |
| 12 | 17 | 6 | 0 | 28 | 20 | 13 | 0 | 16 | 19 | 48 | 9 | 12 |
| 13 | 23 | 5 | 0 | 26 | 16 | 17 | 0 | 12 | 23 | 68 | 8 | 16 |
| 14 | 30 | 15 | 0 | 15 | 10 | 23 | 0 | 32 | 22 | 61 | 7 | 22 |
| 15 | 17 | 18 | 0 | 8 | 16 | 25 | 7 | 34 | 20 | 45 | 0 | 34 |
| 16 | 12 | 15 | 0 | 15 | 14 | 28 | 7 | 36 | 18 | 49 | 0 | 33 |
| 17 | 18 | 15 | 0 | 19 | 8 | 31 | 14 | 34 | 30 | 44 | 0 | 32 |
| 18 | 8 | 24 | 0 | 22 | 8 | 24 | 20 | 24 | 26 | 37 | 0 | 29 |
| 19 | 20 | 23 | 0 | 25 | 7 | 20 | 13 | 15 | 7 | 25 | 0 | 22 |
| 20 | 20 | 20 | 0 | 20 | 0 | 19 | 12 | 8 | 0 | 10 | 0 | 12 |
| 21 | 13 | 30 | 0 | 17 | 0 | 15 | 8 | 9 | 15 | 9 | 0 | 20 |
| 22 | 7 | 31 | 0 | 8 | 0 | 22 | 13 | 9 | 24 | 9 | 10 | 19 |
| 23 | 15 | 22 | 0 | 9 | 7 | 28 | 11 | 9 | 34 | 9 | 8 | 18 |
| 24 | 8 | 25 | 0 | 15 | 7 | 30 | 10 | 17 | 35 | 8 | 7 | 8 |
| 25 | 0 | 18 | 0 | 10 | 16 | 30 | 9 | 22 | 17 | 8 | 14 | 0 |
| 26 | 7 | 17 | 0 | 14 | 17 | 29 | 9 | 25 | 8 | 8 | 8 | 14 |
| 27 | 0 | 9 | 0 | 7 | 18 | 24 | 8 | 16 | 0 | 0 | 9 | 8 |
| 28 | 0 | 11 | 0 | 8 | 18 | 19 | 8 | 17 | 13 | 0 | 16 | 16 |
| 29 | 0 | 11 | 0 | 9 | 23 | 15 | 8 | 19 | 11 | | 8 | 9 |
| 30 | 0 | 10 | 0 | 10 | 30 | 8 | 0 | 19 | 8 | | 8 | 8 |
| 31 | 0 | | 0 | 9 | | 8 | | 12 | 10 | | 8 | |
| MEAN | 12.4 | 12.2 | 1.9 | 16.4 | 13.5 | 20.6 | 5.2 | 15.3 | 15.7 | 22.6 | 8.8 | 13.2 |

1976 yearly mean = 12.6

# DAILY SOLAR FLUX AT 2800 MHz
# OTTAWA ARO

## FLUX ADJUSTED TO 1 A.U., $S_a$

| | 1976 | | | | | | | | 1977 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR |
| 1 | 77.6 | 68.4 | 69.3 | 75.9 | 76.3 | 74.6 | 70.9 | 70.2 | 73.8 | 81.7* | 72.6 | 74.8 |
| 2 | 74.2 | 67.9 | 69.1 | 77.6 | 75.1 | 73.9 | 69.1 | 71.6 | 76.5 | 82.1 | 75.4 | 76.3 |
| 3 | 71.9 | 68.1 | 69.5 | 82.3 | 75.7 | 73.8 | 69.8 | 71.2 | 76.0 | 80.9 | 74.8 | 76.6 |
| 4 | 71.5 | 68.4 | 68.6 | 82.3 | 75.9 | 73.1 | 69.9 | 71.3 | 75.5 | 78.7 | 76.9 | 76.8 |
| 5 | 71.1 | 68.7 | 69.5 | 84.2 | 75.4 | 74.8 | 70.9 | 70.1 | 74.0 | 77.8 | 77.6 | 75.5 |
| 6 | 69.9 | 69.3 | 69.6 | 84.3 | 73.1 | 74.7 | 69.7 | 70.1 | 72.4 | 75.2 | 77.6 | 76.1 |
| 7 | 70.3 | 69.0 | 69.5 | 83.7 | 73.0 | 74.5 | 69.5 | 69.7 | 71.4 | 74.6 | 77.2 | 75.5* |
| 8 | 70.2 | 70.7 | 69.7 | 82.8 | 72.9 | 74.6 | 69.3 | 70.8 | 69.6 | 78.6 | 81.6 | 74.3 |
| 9 | 70.6 | 70.1 | 69.7 | 82.8 | 73.2 | 74.8 | 70.7 | 74.3 | 68.4 | 83.1 | 80.3 | 74.8 |
| 10 | 71.7 | 71.0 | 70.1 | 82.8 | 75.8 | 74.9 | 69.4 | 76.8 | 68.8 | 83.5 | 80.5 | 76.5 |
| 11 | 72.5 | 71.4 | 70.2 | 80.4 | 75.7 | 73.7 | 70.5 | 78.3 | 71.2 | 84.6 | 78.9 | 79.2 |
| 12 | 72.6 | 71.7 | 69.8 | 80.6 | 75.7 | 73.3 | 70.8 | 78.6 | 74.9 | 86.9* | 78.6 | 80.2 |
| 13 | 73.6 | 72.0 | 69.8 | 78.7 | 74.3 | 72.6 | 69.4 | 78.1 | 77.5 | 88.5 | 77.9 | 82.7 |
| 14 | 74.2 | 73.7 | 70.7 | 73.4 | 74.7 | 74.4 | 69.2 | 81.0 | 74.5 | 85.2 | 77.2 | 83.4 |
| 15 | 76.9 | 74.3 | 71.4 | 72.8 | 73.9 | 75.5 | 71.1 | 79.8 | 75.6 | 84.4 | 74.8 | 86.8 |
| 16 | 79.2 | 77.1 | 69.8 | 72.9 | 75.8 | 77.0 | 71.1 | 77.8 | 77.5 | 85.7 | 74.1 | 83.7 |
| 17 | 78.5 | 77.1 | 69.4 | 77.8 | 76.5 | 78.0 | 72.8 | 75.5 | 76.1 | 89.6* | 74.1 | 83.6 |
| 18 | 75.6* | 77.9 | 70.6 | 78.2 | 74.3 | 77.3 | 75.6 | 73.8 | 75.4 | 86.5 | 73.9 | 80.8 |
| 19 | 73.8 | 76.9 | 70.2 | 76.1 | 73.3 | 76.6* | 74.6* | 72.9 | 76.9 | 82.8 | 74.8 | 79.8* |
| 20 | 73.0 | 76.9 | 69.4 | 74.5 | 72.2 | 75.8 | 72.9 | 71.7 | 75.2 | 81.1 | 72.3 | 80.4* |
| 21 | 74.0 | 77.7 | 70.1 | 73.2 | 70.9 | 73.5 | 73.2 | 71.8 | 74.0 | 79.6 | 72.8 | 80.8 |
| 22 | 72.5 | 78.9 | 70.1 | 72.3 | 70.5 | 75.4 | 73.3 | 73.4 | 76.8 | 75.9 | 74.6 | 80.1 |
| 23 | 71.9 | 76.5 | 68.7 | 70.8 | 72.0 | 80.1 | 72.5 | 73.7 | 78.7 | 75.9 | 74.7 | 77.5 |
| 24 | 70.8 | 75.2 | 69.4 | 70.9 | 72.5 | 80.1 | 72.9 | 74.2 | 77.4 | 74.2 | 74.8 | 76.5 |
| 25 | 69.8 | 74.9 | 68.8 | 70.6 | 73.4 | 84.7 | 72.7 | 75.6 | 74.9 | 74.3 | 74.0 | 76.4 |
| 26 | 69.5 | 74.3 | 68.5 | 70.1 | 72.8 | 80.4 | 72.1 | 75.6 | 76.0 | 72.3 | 75.1 | 75.4 |
| 27 | 69.6 | 72.8 | 69.4 | 71.5 | 73.3 | 77.4 | 73.7 | 75.2 | 75.3 | 72.0 | 74.5 | 74.9 |
| 28 | 69.0 | 71.8 | 69.4 | 72.8 | 73.6 | 73.8 | 71.7 | 74.5 | 77.1 | 72.6 | 74.4 | 74.2 |
| 29 | 68.8 | 71.3 | 69.4 | 73.3 | 71.9 | 72.1 | 69.7 | 74.8 | 76.1 | | 75.4 | 74.8 |
| 30 | 68.1 | 70.3 | 70.7 | 73.0 | 72.6 | 72.1 | 69.7 | 75.1 | 76.3 | | 74.6 | 76.6 |
| 31 | 68.7 | | 72.3 | 73.8 | | 70.4 | | 76.4 | 79.6 | | 74.1 | |
| MEAN | 72.2 | 72.6 | 69.8 | 76.6 | 73.9 | 75.4 | 71.3 | 74.3 | 74.9 | 80.3 | 75.8 | 78.2 |

* adjusted for burst

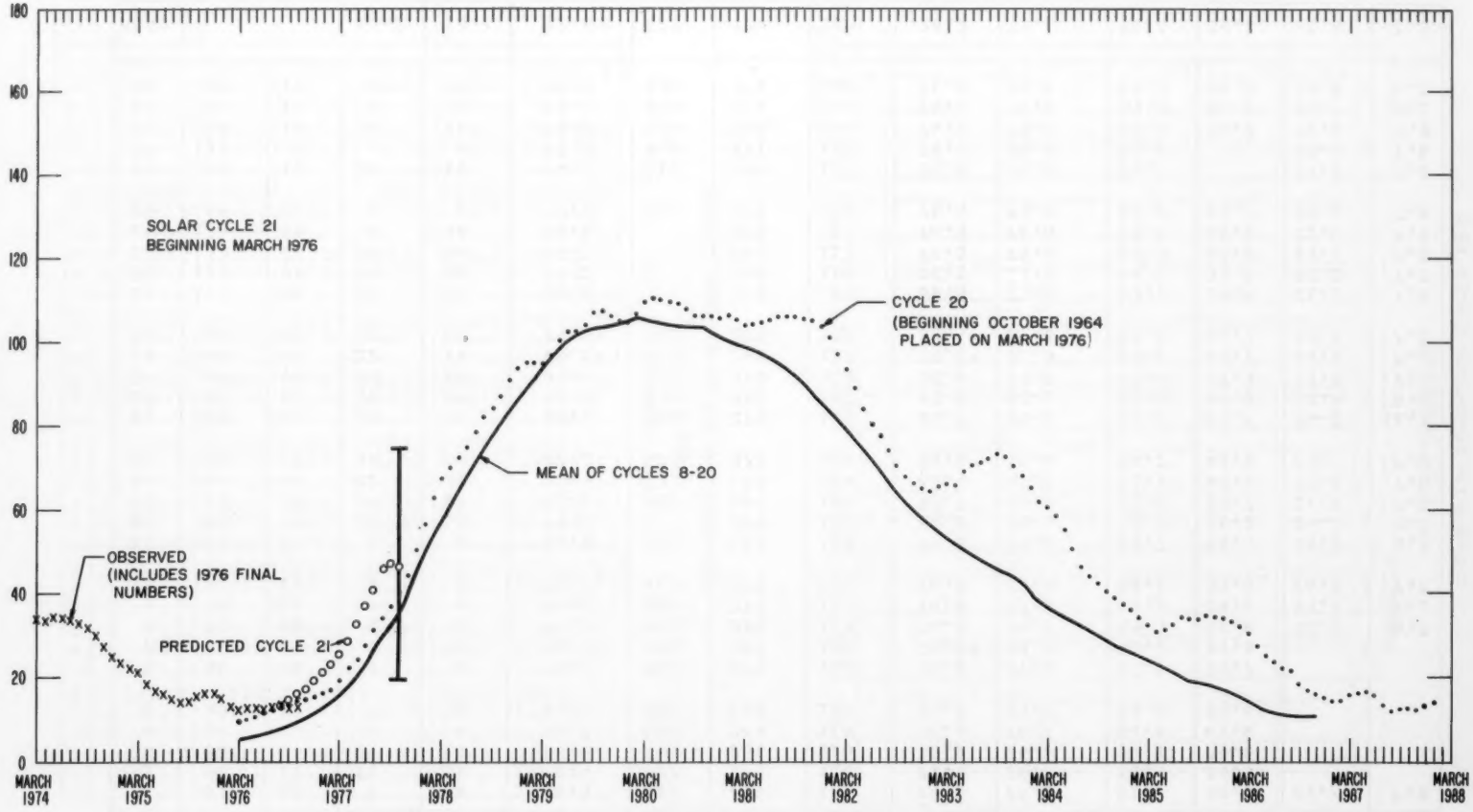
# DAILY SOLAR INDICES

APRIL 1977

| APR 1977 | YEAR DAY | BARTELS 27-DAY CYCLE NUMBER | SUNSPOT NUMBERS | | OBSERVED FLUX | SOLAR FLUX ADJUSTED TO 1 A.U. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $R_Z$ | $R_{A'}$ | OTTAWA 2800 | AFGL 15400 | AFGL 8800 | AFGL 4995 | OTTAWA 2800 | AFGL 2695 | AFGL 1415 | AFGL 606 | AFGL 410 | AFGL 245 |
| 1 | 91 | 13 | 7 | 5 | 74.9 | 521 | 274 | 115 | 74.8 | 75.1 | 50.5 | 39.2 | 23.7 | 7.8 |
| 2 | 92 | 14 | 11 | 11 | 76.4 | 527 | 271 | 116 | 76.3 | 76.7 | 51.9 | 39.5 | | |
| 3 | 93 | 15 | 10 | 10 | 76.6 | 516 | 269 | 116 | 76.6 | 75.0 | 51.1 | 39.6 | | |
| 4 | 94 | 16 | 7 | 4 | 76.7 | 525 | 279 | 116 | 76.8 | 76.7 | 51.9 | 41.4 | | |
| 5 | 95 | 17 | 7 | 6 | 75.4 | 525 | 276 | 115 | 75.5 | 73.7 | 51.9 | 39.6 | | |
| 6 | 96 | 18 | 8 | 4 | 75.9 | 516 | 275 | 116 | 76.1 | 77.8 | 52.5 | 39.7 | | |
| 7 | 97 | 19 | 7 | 3 | 75.3* | 524 | 277 | 115 | 75.5* | 78.8 | 51.4 | 37.8 | | |
| 8 | 98 | 20 | 0 | 0 | 74.1 | 524 | 270 | 113 | 74.3 | 74.3 | 49.3 | 40.4 | 20.9 | 6.7 |
| 9 | 99 | 21 | 0 | 0 | 74.6 | 524 | 277 | 116 | 74.8 | 77.3 | 51.2 | 38.5 | 23.3 | 7.1 |
| 10 | 100 | 22 | 0 | 0 | 76.2 | 522 | 278 | 116 | 76.5 | 76.4 | 50.2 | 39.6 | 24.0 | 7.7 |
| 11 | 101 | 23 | 8 | 5 | 78.8 | 524 | 273 | 118 | 79.2 | 79.6 | 53.7 | 41.3 | 24.3 | 8.2 |
| 12 | 102 | 24 | 12 | 11 | 79.8 | | 275 | 122 | 80.2 | 79.1 | 50.5 | 36.2 | 24.2 | 8.2 |
| 13 | 103 | 25 | 16 | 18 | 82.2 | 527 | 276 | 124 | 82.7 | 81.4 | 51.2 | 39.7 | 21.5 | 7.5 |
| 14 | 104 | 26 | 22 | 20 | 82.9 | 522 | 279 | 124 | 83.4 | 83.5 | 51.9 | 40.4 | 22.4 | 7.6 |
| 15 | 105 | 27 | 34 | 21 | 86.2 | 523 | 276 | 124 | 86.8 | 86.6 | 54.2 | 41.5 | 23.1 | 7.9 |
| 16 | 106 | 01 | 33 | 22 | 83.1 | 524 | 276 | 121 | 83.7 | 85.1 | 53.7 | 40.7 | 24.3 | 11.3 |
| 17 | 107 | 02 | 32 | 29 | 82.9 | 528 | 280 | 122 | 83.6 | 82.6 | 52.4 | 40.9 | 22.5 | 8.6 |
| 18 | 108 | 03 | 29 | 23 | 80.1 | 527 | 270 | 119 | 80.8 | 78.7 | 51.4 | 37.8 | 23.6 | 7.5 |
| 19 | 109 | 04 | 22 | 15 | 79.1* | 523 | 286 | 121 | 79.8* | 81.9 | 53.1 | 40.7 | 20.9 | 7.2 |
| 20 | 110 | 05 | 12 | 12 | 79.6* | 522 | 276 | 121 | 80.4* | 81.3 | 52.8 | 44.1 | 19.7 | 7.3 |
| 21 | 111 | 06 | 20 | 15 | 80.0 | | 273 | 119 | 80.8 | 79.1 | 53.0 | 39.6 | 21.1 | 7.6 |
| 22 | 112 | 07 | 19 | 14 | 79.2 | | 269 | 119 | 80.1 | 78.1 | 48.9 | 38.5 | 22.3 | 7.3 |
| 23 | 113 | 08 | 18 | 14 | 76.7 | | 263 | 117 | 77.5 | 75.9 | 50.9 | 43.2 | 19.1 | 7.3 |
| 24 | 114 | 09 | 8 | 10 | 75.6 | | 270 | 115 | 76.5 | 76.0 | 52.4 | 45.5 | 20.4 | 7.0 |
| 25 | 115 | 10 | 0 | 0 | 75.5 | 524 | 277 | 116 | 76.4 | 78.2 | 52.8 | 41.7 | 20.1 | 7.6 |
| 26 | 116 | 11 | 14 | 10 | 74.4 | 516 | 269 | 115 | 75.4 | 75.8 | 51.5 | | 20.6 | 7.9 |
| 27 | 117 | 12 | 8 | 9 | 73.9 | 513 | 271 | 115 | 74.9 | 75.3 | 52.6 | | 19.2 | 7.6 |
| 28 | 118 | 13 | 16 | 10 | 73.2 | 520 | 266 | 114 | 74.2 | 73.6 | 51.9 | 34.2 | 20.4 | 7.9 |
| 29 | 119 | 14 | 9 | 10 | 73.7 | 518 | 271 | 114 | 74.8 | 75.5 | 49.9 | 34.5 | 20.7 | 8.1 |
| 30 | 120 | 15 | 8 | 9 | 75.5 | 521 | 271 | 116 | 76.6 | 74.2 | 49.9 | 35.9 | 20.5 | 8.3 |
| MEAN | | | 13.2 | 10.7 | 77.6 | 522 | 274 | 118 | 78.2 | 78.1 | 51.7 | 39.7 | 21.8 | 7.8 |

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill data are due to equipment problems.




PREDICTED AND OBSERVED SUNSPOT NUMBERS

## SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
## CYCLE 21

| MONTH | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1976 | 15.2 | 13.2 | 12.2 | 12.6 | 12.5 | 12.2 | 12.9 | 13.9 | 14.1 | 13.3 | 14.6<br>( 1) | 16.4<br>( 2) |
| 1977 | 18.3<br>( 4) | 20.2<br>( 6) | 22.6<br>( 7) | 25.6<br>(10) | 29.0<br>(12) | 32.8<br>(15) | 36.3<br>(17) | 39.7<br>(20) | 43.0<br>(24) | 46.9<br>(28) | 51.4<br>(31) | 56.0<br>(34) |
| 1978 | 60.7<br>(38) | 66.1<br>(42) | 70.8<br>(45) | 74.4<br>(48) | 77.5<br>(52) | 80.3<br>(55) | 83.6<br>(56) | 88.1<br>(56) | 93.4<br>(59) | 97.8<br>(61) | 102.0<br>(62) | 105.8<br>(64) |
| 1979 | 108.9<br>(65) | 111.3<br>(66) | 114.2<br>(70) | 117.9<br>(73) | 120.7<br>(74) | 122.3<br>(75) | 122.9<br>(77) | 123.0<br>(77) | 122.5<br>(77) | 121.6<br>(76) | 120.9<br>(74) | 120.9<br>(71) |
| 1980 | 121.4<br>(71) | 121.2<br>(71) | 120.0<br>(68) | 118.6<br>(66) | 117.1<br>(64) | 116.4<br>(62) | 116.1<br>(62) | 115.4<br>(62) | 115.4<br>(62) | 116.2<br>(63) | 115.6<br>(63) | 113.6<br>(61) |
| 1981 | 111.2<br>(59) | 109.8<br>(57) | 109.0<br>(55) | 108.9<br>(53) | 109.3<br>(52) | 109.3<br>(50) | 108.6<br>(49) | 107.0<br>(47) | 104.7<br>(44) | 101.5<br>(43) | 98.5<br>(41) | 96.2<br>(41) |
| 1982 | 94.5<br>(39) | 92.6<br>(37) | 89.7<br>(36) | 85.7<br>(35) | 81.4<br>(33) | 78.2<br>(30) | 74.3<br>(26) | 71.3<br>(25) | 68.1<br>(24) | 64.9<br>(23) | 63.1<br>(22) | 62.0<br>(22) |
| 1983 | 60.7<br>(22) | 59.0<br>(22) | 57.0<br>(22) | 56.0<br>(23) | 55.5<br>(23) | 54.5<br>(25) | 53.6<br>(26) | 52.8<br>(27) | 52.2<br>(27) | 51.1<br>(27) | 49.3<br>(27) | 46.7<br>(26) |
| 1984 | 43.8<br>(27) | 41.6<br>(28) | 40.5<br>(29) | 39.1<br>(30) | 37.1<br>(30) | 35.6<br>(29) | 34.3<br>(28) | 33.2<br>(27) | 32.0<br>(26) | 30.9<br>(26) | 29.7<br>(25) | 28.8<br>(25) |
| 1985 | 28.2<br>(25) | 27.3<br>(24) | 26.1<br>(23) | 25.1<br>(22) | 24.4<br>(21) | 23.8<br>(21) | 23.2<br>(21) | 22.2<br>(22) | 21.7<br>(22) | 21.9<br>(22) | 21.8<br>(21) | 21.2<br>(21) |
| 1986 | 20.2<br>(20) | 19.2<br>(19) | 18.1<br>(18) | 17.0<br>(17) | 16.1<br>(16) | 15.4<br>(15) | 14.9<br>(13) | 14.7<br>(12) | 14.1<br>(11) | 13.6<br>(10) | 13.5<br>(10) | 13.6<br>(10) |
| 1987 | 14.0<br>(11) | 14.8<br>(12) | 15.5<br>(13) | 16.3<br>(14) | 17.1<br>(15) | | | | | | | |

For each month, the upper figure is the observed or predicted Zürich smoothed sunspot number. The lower figure in parenthesis is the corresponding absolute value of the 90% prediction interval, an indication of the uncertainty above and below the predicted number. Observed numbers are those with no prediction intervals. The observed smoothed sunspot numbers are based on final Zürich numbers through 1976.

The predicted sunspot numbers are derived from a regression analysis based on cycles 8 through 20. Tests indicate that earlier cycles are from a different statistical population.

# Hα SOLAR FLARES

APRIL 1977

| OBSERV-ATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION — MIN. | IMPORTANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | APPROX. | | CENTRAL DISTANCE | MCMATH PLAGE REGION | CMP DAY | | | | | | | | |
| | DATE APR | START | MAX PHASE | END | LAT. | MER. DIST. | | | | | | COND. | TYPE | TIME — UT | MEAS. AREA Mill. of Disk | CORR. AREA Sq. Deg. | |
| CATA | 03 | 0800E | 0800 | 0815D | N23 | W33 | .691 | | 31.9 | 15D | SF | 2 | | 0800 | 84 | 1.2 | |
| CATA | 04 | 1215 | 1220 | 1240 | N30 | E77 | .990 | 14713 | 10.3 | 25 | 1F | 2 | | 1220 | 112 | | |
| HTPR | 05 | 1608 | 1611 | 1618 | N19 | W52 | .840 | | 1.8 | 10 | SF | | C | 1611 | 20 | .3 | |
| HTPR | 05 | 1640 | 1642 | 1645 | N19 | W52 | .840 | | 1.8 | 5 | SF | | C | 1642 | 30 | .4 | E |
| RAMY | 06 | 2007E | 2010 | 2021 | N18 | W68 | .947 | | 1.7 | 14D | SF | 3 | C | | 127 | | DE |
| KODA | 07 | 0246 | 0249 | 0300 | N15 | W70 | .954 | 14717 | 1.9 | 14 | 1N | | P | 0246 | 405 | 4.2 | CDH |
| MONT | 12 | 0932 | 0950 | 1033 | S21 | E86 | .995 | 14726 | 18.8 | 61 | 2B | | C | 0950 | 400 | | |
| HTPR | 12 | 0944 | 0958 | 1027 | S21 | E82 | .986 | 14726 | 18.6 | 43 | 1B | | C | 0958 | 150 | | E |
| RAMY | 12 | 1029E | 1030U | 1150 | S15 | E85 | .994 | | 18.8 | 81D | SF | 3 | C | | 96 | | |
| HTPR | 13 | 1130 | 1135 | 1150 | S22 | W67 | .917 | | 8.5 | 20 | SF | | C | 1135 | 40 | 1.0 | |
| MONT | 13 | 1131 | 1133 | 1141 | S21 | E66 | .910 | | 18.4 | 10 | SF | | C | 1133 | 40 | | |
| HTPR | 13 | 1216 | 1220 | 1256 | S22 | W66 | .911 | | 8.6 | 40 | SF | | C | 1220 | 30 | .7 | |
| MONT | 13 | 1227 | 1240 | 1251 | S21 | E66 | .910 | | 18.5 | 24 | SN | | C | 1240 | 60 | | E |
| MCMA | 13 | 1237 | 1239 | 1250 | S21 | E66 | .910 | 14726 | 18.5 | 13 | SN | | C | 1239 | 40 | 1.0 | E |
| MCMA | 13 | 1317 | 1320 | 1328 | S19 | E63 | .888 | 14726 | 18.3 | 11 | SN | | C | 1320 | 30 | .7 | DH |
| MONT | 13 | 1339 | 1346 | 1400D | S21 | E65 | .903 | | 18.4 | 21D | SN | | C | 1346 | 60 | | E |
| MCMA | 13 | 1343 | 1347 | 1358 | S20 | E60 | .865 | 14726 | 18.1 | 15 | SN | | C | 1347 | 40 | 1.0 | EH |
| HTPR | 13 | 1342 | 1347 | 1356 | S21 | W61 | .874 | | 9.0 | 14 | SF | | C | 1347 | 20 | .4 | E |
| HTPR | 13 | 1449 | 1454 | 1512 | S22 | W60 | .867 | | 9.1 | 23 | SF | | C | 1454 | 20 | .4 | D |
| MCMA | 13 | 1451 | 1452 | 1457 | S21 | E60 | .866 | 14726 | 18.1 | 6 | SF | | C | 1452 | 30 | .6 | E |
| HTPR | 13 | 1513 | 1514 | 1520 | S21 | W62 | .882 | | 9.0 | 7 | SF | | C | 1514 | 10 | .2 | D |
| HTPR | 13 | 1535 | 1538 | 1545 | S21 | W64 | .896 | | 8.8 | 10 | SN | | C | 1538 | 30 | .7 | E |
| MCMA | 13 | 1535 | 1538 | 1542 | S21 | E62 | .882 | 14726 | 18.3 | 7 | SF | | C | 1538 | 30 | .7 | D |
| MCMA | 13 | 1550 | 1552 | 1604D | S21 | E62 | .882 | 14726 | 18.3 | 14D | SN | | C | 1552 | 40 | .9 | EH |
| HTPR | 13 | 1612 | | 1614D | S21 | W63 | .889 | | 9.0 | 2D | SF | | C | 1614 | 30 | .7 | |
| MCMA | 13 | 1613E | | 1615D | S22 | E59 | .858 | 14726 | 18.1 | 2D | SN | | P | 1613 | 70 | 1.5 | E |
| MCMA | 13 | 1715E | 1728 | 1815D | S21 | E61 | .874 | 14726 | 18.3 | 60D | SB | | C | 1728 | 50 | 1.1 | E |
| RAMY | 13 | 1727E | 1729 | 1736D | S20 | E62 | .881 | | 18.4 | 9D | SF | 2 | C | | 128 | | Z F |
| PALE | 13 | 2130 | 2132 | 2144D | S21 | E59 | .858 | 14726 | 18.3 | 14D | 1N | 3 | C | | 132 | | DEDE |
| PALE | 13 | 2130 | 2132 | 0000 | S21 | E59 | .858 | 14726 | 18.3 | 150 | 1N | 3 | V | | 132 | | DEDE |
| PALE | 13 | 2218E | 2220U | 2255D | S21 | E59 | .858 | | 18.4 | 37D | SF | 3 | C | | 41 | | DE |
| PALE | 13 | 2334 | 2344 | 2349D | S21 | E58 | .849 | 14726 | 18.3 | 15D | 2F | 3 | V | | 379 | | UDE |
| PALE | 13 | 2334 | 2344 | 2359 | S21 | E58 | .849 | 14726 | 18.3 | 25 | 2F | 3 | C | | 379 | | UDE |
| UPIC | 14 | 0650E | | 0655U | S22 | E53 | .806 | | 18.3 | 5U | SF | | P | 0650 | 41 | 35.0 | B |
| MCMA | 14 | 1254 | 1255 | 1304 | S20 | E48 | .752 | 14726 | 18.1 | 10 | SF | | C | 1255 | 20 | .3 | D |
| MCMA | 14 | 1611 | 1623 | 1650 | S21 | E47 | .743 | 14726 | 18.2 | 39 | SN | | C | 1623 | 50 | .7 | EL |
| HTPR | 14 | 1617 | 1617 | 1621 | S20 | E55 | .821 | | 18.8 | 4 | SF | | C | 1617 | 20 | .3 | |
| HTPR | 14 | 1618 | 1624 | 1642 | S21 | E50 | .774 | | 18.4 | 24 | SN | | C | 1624 | 100 | 1.3 | E |
| MCMA | 14 | 1831 | 1834 | 1858 | S21 | E46 | .732 | 14726 | 18.2 | 27 | SN | | C | 1834 | 70 | 1.1 | E |
| MCMA | 14 | 2020 | 2030 | 2040 | S21 | E45 | .721 | 14726 | 18.2 | 20 | SF | | C | 2030 | 50 | .7 | E |
| MCMA | 14 | 2105 | 2108 | 2135 | S21 | E45 | .721 | 14726 | 18.3 | 30 | SB | | C | 2108 | 80 | 1.2 | E |
| PALE | 15 | 0153 | 0156 | 0214 | S22 | E42 | .691 | | 18.2 | 21 | SF | 3 | C | | 60 | | DE R |
| HTPR | 15 | 0851 | 0856 | 0948 | S21 | E40 | .665 | | 18.4 | 57 | SN | | C | 0856 | 70 | .8 | E |
| TEHR | 15 | 0857 | 0901 | 0916 | S20 | E36 | .613 | 14726 | 18.1 | 19 | 1N | 3 | C | | 350 | | DE |
| MONT | 15 | 1041 | 1056 | 1111 | S22 | E46 | .735 | | 18.9 | 30 | SF | | C | 1056 | 60 | | E |
| HTPR | 15 | 1519 | 1520 | 1532 | S20 | E35 | .601 | | 18.3 | 13 | SF | | C | 1520 | 20 | .2 | |
| MCMA | 15 | 1519 | 1528 | 1538D | S21 | E33 | .580 | 14726 | 18.1 | 19D | SF | | C | 1528 | 50 | .6 | EL |
| HTPR | 15 | 1601 | 1609 | 1619 | S19 | E33 | .571 | | 18.1 | 18 | SF | | C | 1609 | 20 | .2 | |
| HTPR | 15 | 1652 | | 1744 | S19 | E33 | .571 | | 18.2 | 52 | SF | | C | 1732 | 30 | .3 | E |
| MCMA | 15 | 1655E | | 1720D | S20 | E34 | .588 | 14726 | 18.3 | 25D | SN | | C | 1658 | 50 | .6 | EL |
| HTPR | 15 | 1659 | 1704 | 1717 | S19 | E34 | .584 | | 18.3 | 18 | SF | | C | 1704 | 30 | .3 | E |
| RAMY | 15 | 1726E | 1731U | 1740 | S18 | E33 | .566 | | 18.2 | 14D | SF | 3 | C | | 60 | | FDE |
| MCMA | 15 | 1801E | | 1825 | S20 | E34 | .588 | 14726 | 18.3 | 24D | SF | | C | 1803 | 60 | .8 | E |
| HTPR | 16 | 0711 | 0714 | 0735 | S22 | E35 | .610 | | 18.9 | 24 | SF | | C | 0714 | 30 | .3 | E |
| HTPR | 16 | 0725 | 0732 | 0827 | S21 | E26 | .493 | | 18.3 | 62 | SN | | C | 0732 | 60 | .6 | E |
| CATA | 16 | 0740E | 0810 | 0830D | S22 | E32 | .574 | | 18.7 | 50D | SN | 2 | | 0810 | 84 | 1.1 | |
| HTPR | 16 | 1141 | 1145 | 1220 | S20 | E23 | .448 | | 18.2 | 39 | SB | | C | 1145 | 50 | .5 | E |
| RAMY | 16 | 1141 | 1148U | 1157D | S18 | E21 | .407 | 14726 | 18.1 | 16D | 1N | 2 | C | | 206 | | FDE |
| MONT | 16 | 1141 | 1144 | 1222 | S19 | E25 | .467 | | 18.4 | 41 | SN | | C | 1144 | 60 | | E |
| HTPR | 16 | 1722 | | 1747D | S19 | E20 | .402 | | 18.2 | 25D | SB | | C | 1728 | 150 | 1.5 | E |
| PALE | 16 | 1730E | 1730U | 1757 | S19 | E20 | .402 | | 18.2 | 27D | SF | 3 | C | | 72 | | FDE |
| PALE | 16 | 2109 | 2115 | 2141 | S19 | E18 | .376 | 14726 | 18.2 | 32 | 1N | 3 | C | | 315 | | FDE |
| PALE | 16 | 2109 | 2114 | 2141 | S19 | E18 | .376 | 14726 | 18.2 | 32 | 1N | 3 | C | | 274 | | FDE |

# Hα SOLAR FLARES

APRIL 1977

| OBSERV-ATORY | OBSERVED UT | | | | LOCATION | | | | | DURA-TION | IM-POR-TANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE APR | START | MAX. PHASE | END | APPROX. LAT. | APPROX. MER. DIST. | CENTRAL DISTANCE | MCMATH PLAGE REGION | CMP DAY | MIN. | | COND. | TYPE | TIME UT | MEAS. AREA millionths of Disk | CORR. AREA Sq. Deg. | |
| PALE | 16 | 2109 | 2115 | 2129D | S19 | E18 | .376 | 14726 | 18.2 | 20D | 1N | 3 | V | | 289 | | FDE |
| PALE | 16 | 2109 | 2114 | 2129D | S19 | E18 | .376 | 14726 | 18.2 | 20D | 1N | 3 | V | | 274 | | FDE |
| PALE | 16 | 2307 | 2316 | 0150 | S21 | E18 | .396 | 14726 | 18.3 | 163 | 2B | 3 | C | | 554 | | DE F |
| MITK | 16 | 2325E | | 2404D | S20 | E17 | .374 | 14726 | 18.3 | 39D | 1N | | C | 2325 | 270 | 3.1 | F |
| MITK | 17 | 0026E | 0032 | 0042 | S22 | E19 | .418 | | 18.4 | 16D | SN | | C | 0032 | 70 | .8 | |
| PALE | 17 | 0255E | 0258 | 0318 | S21 | E17 | .385 | | 18.4 | 23D | SF | 3 | C | | 40 | | |
| CATA | 17 | 1040 | 1050 | 1106D | S20 | E10 | .300 | 14726 | 18.2 | 26D | 1N | 1 | | 1050 | 224 | 2.4 | |
| TEHR | 17 | 1050 | 1059 | 1116 | S21 | E10 | .314 | 14726 | 18.2 | 26 | 1N | 3 | C | | 318 | | F S |
| UPIC | 17 | 1115E | | 1120U | S21 | E11 | .323 | | 18.3 | 5U | SF | | P | 1115 | 61 | 32.0 | B |
| PALE | 17 | 2212 | 2214 | 2220 | S21 | E 7 | .292 | | 18.5 | 8 | SF | 3 | C | | 79 | | |
| MCMA | 18 | 1801E | | 1814D | S22 | E01 | .286 | 14726 | 18.8 | 13D | SF | | C | 1803 | 40 | .4 | E |
| HTPR | 19 | 0722 | | 0729D | S21 | W09 | .308 | | 18.6 | 7D | SF | | C | 0726 | 20 | .2 | |
| BUCH | 19 | 0725 | | 0801 | S22 | W09 | .323 | 14726 | 18.6 | 36 | 1N | | C | 0742 | 322 | 3.5 | E |
| MITK | 19 | 0735 | 0739 | 0753 | S22 | W08 | .316 | | 18.7 | 18 | SN | | C | 0739 | 140 | 1.5 | E |
| CATA | 19 | 0740E | 0747 | 0815D | S21 | W09 | .308 | 14726 | 18.6 | 35D | 1B | 2 | | 0747 | 281 | 3.0 | |
| MCMA | 19 | 1604E | | 1629D | S22 | W18 | .409 | 14726 | 18.3 | 25D | SN | | P | 1608 | 100 | 1.1 | EL |
| RAMY | 19 | 1623E | 1626U | 1630D | S20 | W18 | .388 | | 18.3 | 7D | SF | 3 | C | | 95 | | FDE |
| MITK | 20 | 0610 | 0613 | 0627 | S21 | W21 | .435 | | 18.7 | 17 | SN | | C | 0613 | 60 | .7 | E |
| MCMA | 20 | 1634E | 1641 | 1705D | S22 | W30 | .552 | 14726 | 18.4 | 31D | SB | | C | 1641 | 60 | .7 | EFHL |
| HTPR | 20 | 1637 | 1643 | 1657D | S21 | W33 | .583 | | 18.2 | 20D | SF | | C | 1643 | 50 | .5 | E |
| RAMY | 20 | 1637 | 1643 | 1650D | S22 | W31 | .564 | | 18.4 | 13D | SN | 3 | C | | 190 | | FDE |
| MONT | 21 | 0826 | 0835 | 0900 | S19 | W40 | .661 | | 18.4 | 34 | SN | | C | 0835 | 150 | | E |
| HTPR | 21 | 0828 | 0830 | 0842 | S22 | W39 | .660 | | 18.4 | 14 | SF | | C | 0830 | 10 | .1 | |
| HTPR | 21 | 0831 | 0835 | 0840 | S19 | W42 | .685 | | 18.2 | 9 | SF | | C | 0835 | 10 | .1 | |
| HTPR | 21 | 0831 | 0835 | 0844 | S23 | W40 | .676 | | 18.4 | 13 | SF | | C | 0835 | 10 | .1 | |
| MONT | 21 | 1344 | 1349 | 1402 | S21 | W34 | .596 | | 19.0 | 18 | SN | | C | 1349 | 80 | | D |
| HTPR | 21 | 1348 | 1351 | 1400 | S20 | W32 | .566 | | 19.2 | 12 | SN | | C | 1351 | 20 | .2 | |
| RAMY | 21 | 1356 | 1400 | 1402D | S24 | W31 | .578 | | 19.3 | 6D | SN | 3 | C | | 48 | | FDE |
| HTPR | 21 | 1424 | 1426 | 1427 | S18 | W44 | .705 | | 18.3 | 3 | SF | | C | 1426 | 10 | .1 | |
| MONT | 21 | 1443 | 1448 | 1451 | S21 | W34 | .596 | | 19.1 | 8 | SF | | C | 1448 | 20 | | D |
| HTPR | 21 | 1511 | 1515 | 1524 | S20 | W33 | .579 | | 19.2 | 13 | SF | | C | 1515 | 20 | .2 | |
| HTPR | 21 | 1527 | 1530 | 1536 | S20 | W45 | .722 | | 18.3 | 9 | SF | | C | 1530 | 10 | .1 | |
| HTPR | 21 | 1534 | 1539 | 1550 | S18 | W45 | .717 | | 18.3 | 16 | SN | | C | 1539 | 70 | .7 | |
| RAMY | 21 | 1537E | 1542 | 1549D | S18 | W45 | .717 | | 18.3 | 12D | SN | 3 | C | | 51 | | DE H |
| HTPR | 21 | 1627 | 1630 | 1651 | S20 | W34 | .591 | | 19.1 | 24 | SN | | C | 1630 | 60 | .6 | |
| PALE | 21 | 1831 | 1832 | 1833 | S21 | W48 | .756 | | 18.2 | 2 | SF | 3 | C | | 20 | | H |
| RAMY | 21 | 2035E | 2040 | 2045D | S18 | W47 | .739 | | 18.3 | 10D | SN | 3 | C | | 86 | | DE H |
| MITK | 22 | 0128 | 0129 | 0139 | S22 | W50 | .779 | | 18.3 | 11 | SN | | C | 0129 | 110 | 1.8 | E |
| MONT | 22 | 0901 | 0905 | 0917 | S22 | W44 | .717 | | 19.1 | 16 | SF | | C | 0905 | 20 | | D |
| HTPR | 22 | 0901 | 0917 | 0925 | S22 | W42 | .695 | | 19.2 | 24 | SF | | C | 0917 | 20 | .2 | |
| HTPR | 22 | 0931 | 0934 | 0938 | S22 | W42 | .695 | | 19.2 | 7 | SF | | C | 0934 | 10 | .1 | |
| HTPR | 22 | 1008 | 1016 | 1022 | S22 | W42 | .695 | | 19.3 | 14 | SF | | C | 1016 | 10 | .1 | |
| MONT | 22 | 1008 | 1016 | 1044 | S21 | W44 | .714 | | 19.1 | 36 | SF | | C | 1016 | 20 | | DHK |
| CATA | 22 | 1225 | 1225 | 1230 | S22 | W46 | .738 | | 19.1 | 5 | SF | 2 | | 1225 | 28 | .4 | |
| CATA | 22 | 1230 | 1245 | 1305 | S22 | W48 | .759 | | 18.9 | 35 | SN | 2 | | 1245 | 84 | 1.3 | |
| HTPR | 22 | 1404 | 1412 | 1440 | S20 | W51 | .785 | | 18.8 | 36 | SF | | C | 1412 | 30 | .3 | E |
| CATA | 22 | 1415 | 1415 | 1435 | S20 | W51 | .785 | | 18.8 | 20 | SN | 2 | | 1415 | 56 | .9 | |
| HTPR | 22 | 1622 | | 1653D | S20 | W52 | .795 | | 18.8 | 31D | SF | | C | 1631 | 30 | .3 | |
| MITK | 23 | 0152 | 0157 | 0211 | S22 | W64 | .899 | | 18.3 | 19 | SN | | C | 0157 | 50 | 1.2 | E |
| MONT | 26 | 0928 | 0933 | 0940 | S19 | E80 | .982 | | 2.4 | 12 | SF | | C | 0933 | 20 | | |
| MONT | 26 | 1146 | 1154 | 1206D | S23 | E83 | .990 | | 2.7 | 20D | SF | | C | 1154 | 60 | | E |
| MONT | 30 | 0944 | 0957 | 1004 | N34 | E90 | 1.001 | | 7.2 | 20 | SF | | C | 0957 | 40 | | D |
| MONT | 30 | 1009 | 1012 | 1019 | N34 | E90 | 1.001 | | 7.2 | 10 | SF | | C | 1012 | 20 | | |
| MONT | 30 | 1113 | 1117 | 1124 | S23 | E27 | .531 | | 2.5 | 11 | SF | | C | 1117 | 40 | | |

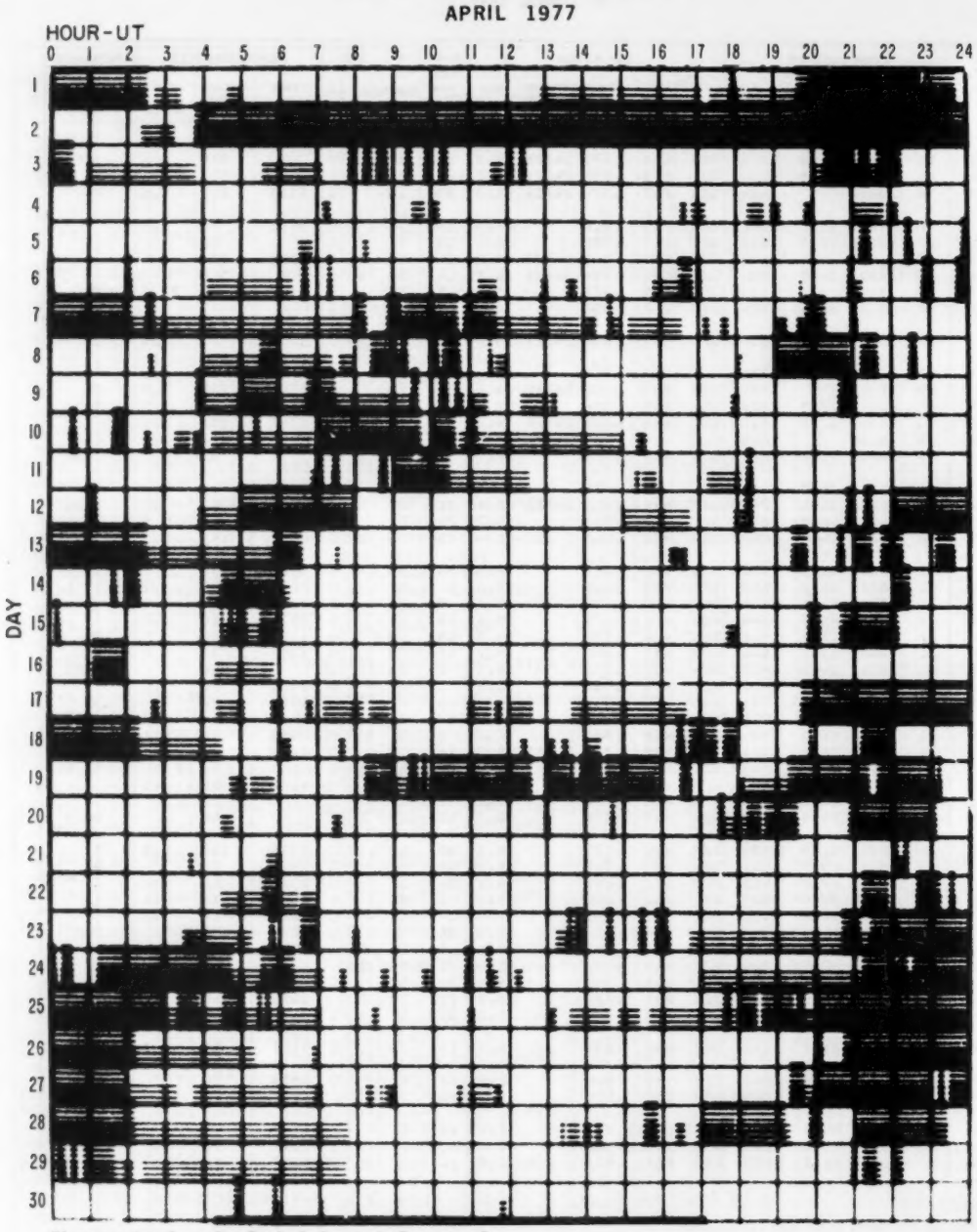
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium $D_3$ in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

# INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

## APRIL 1977



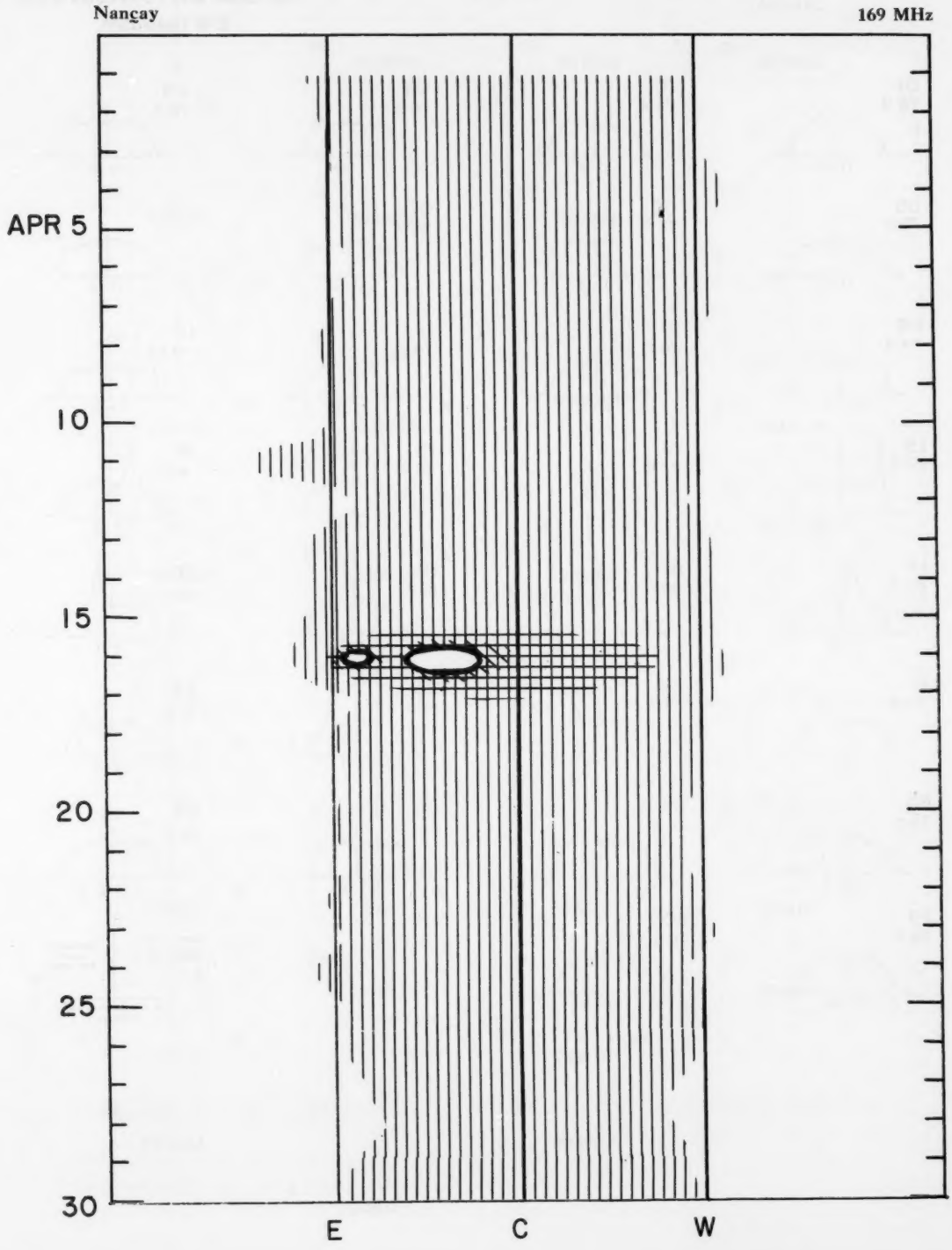

Observatories included in total patrol:

| | | | | | |
|---|---|---|---|---|---|
| Bucharest | Haute Provence | Hurbanovo | Kodaikanal | Monte Mario | Tehran |
| Catania | Herstmonceux | Istanboul | McMath-Hulbert | Palehua | Upice |
| | | | Mitaka | Ramey | Wendelstein |

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

# SOLAR RADIO EMISSION
# INTERFEROMETRIC OBSERVATION

APRIL 1977

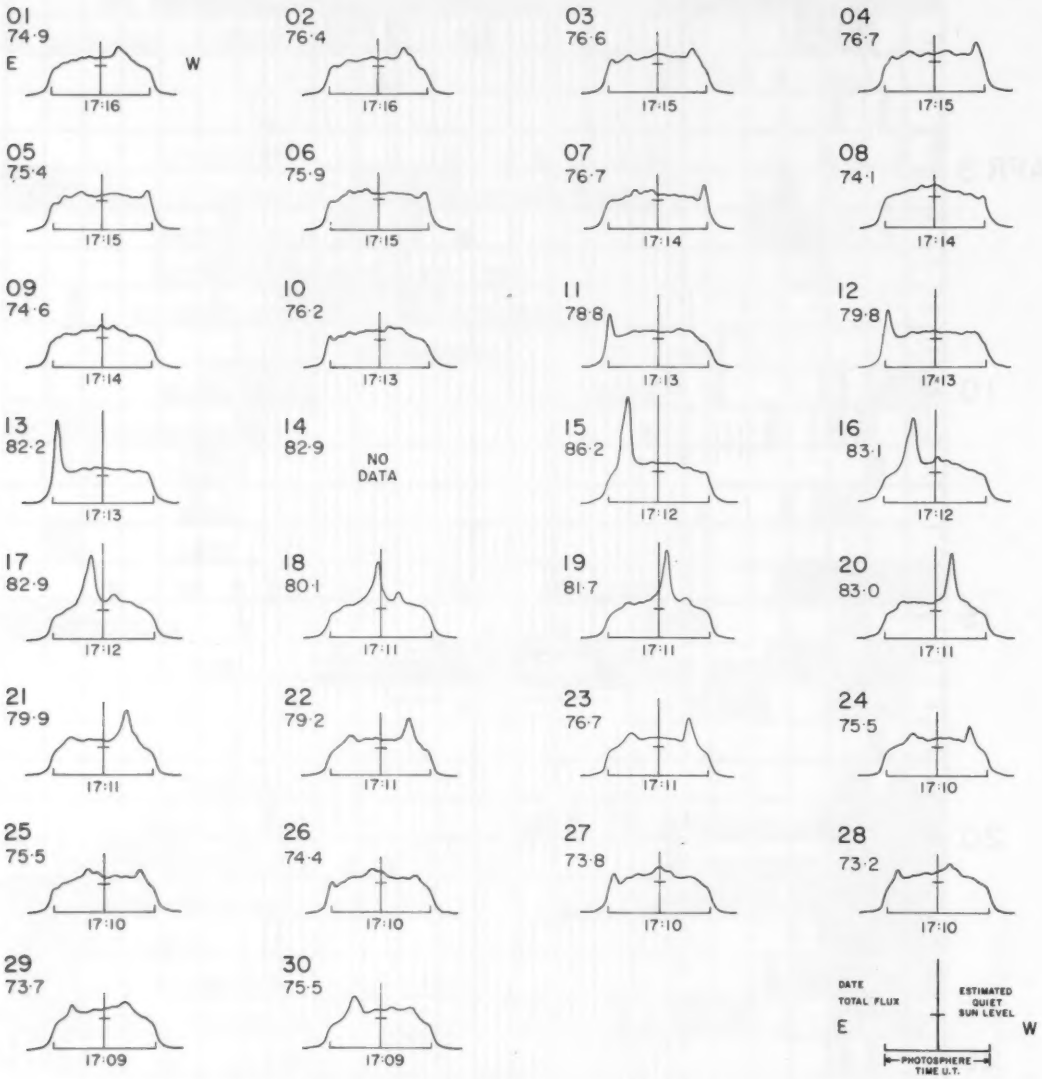


# EAST-WEST SOLAR SCANS

## APRIL 1977

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution

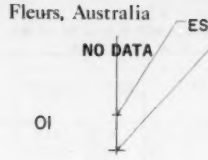


# EAST-WEST SOLAR SCANS

APRIL 1977

Fleurs, Australia

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution

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02 NO DATA

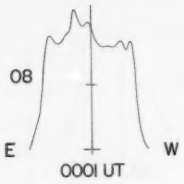
03 NO DATA

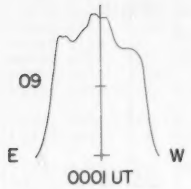
04 NO DATA

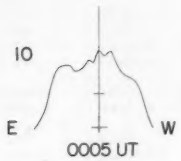
05 NO DATA

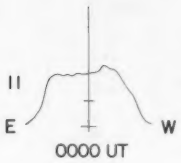
06 NO DATA

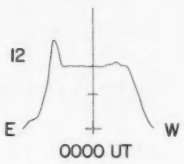
07 NO DATA

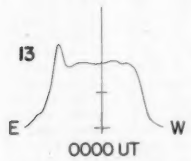


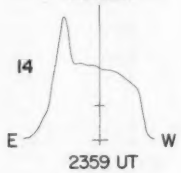



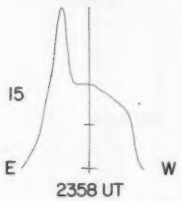



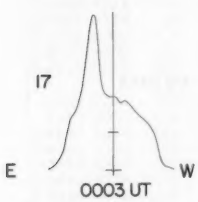



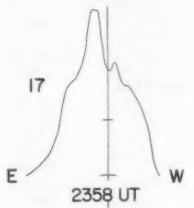




16 NO DATA

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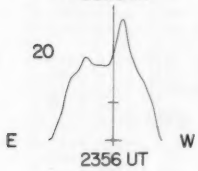


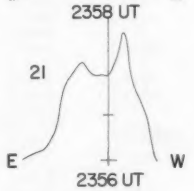


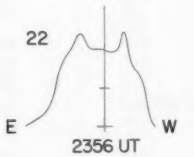


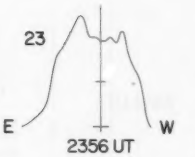

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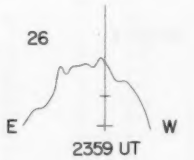
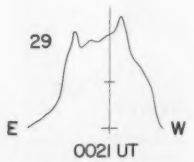



27 NO DATA

28 NO DATA




30 NO DATA

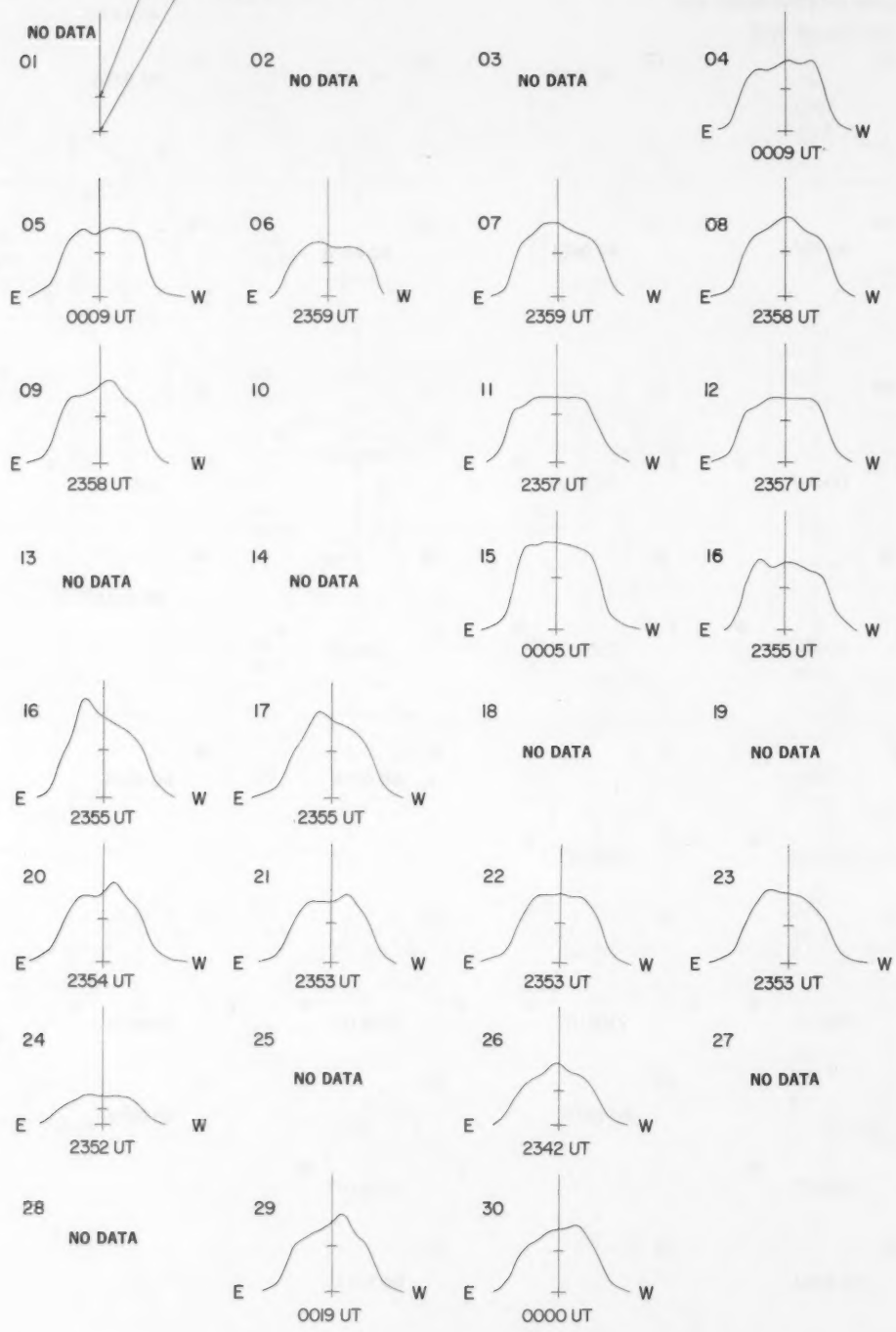
# EAST-WEST SOLAR SCANS

APRIL 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL
COLD SKY LEVEL

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



# SOLAR RADIO EMISSION
## SELECTED FIXED FREQUENCY EVENTS

APRIL 1977

| | FREQUENCY | STATION | TYPE | STARTING TIME | TIME OF MAXIMUM | DURATION | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ | | INT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | UT | UT | MINUTES | PEAK | MEAN | | |
| 2 | 2800 | OTTA | 27 RF | 1435 | | 180 | 0.8 | 0.7 | | |
| | 2800 | OTTA | 24 R | 1435 | 1450 | 15 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 24P R | 1450 | | 125 | 0.8 | | | |
| | 2800 | OTTA | 26 FAL | 1655 | 1735 | 40 | -0.8 | -0.4 | | |
| | 2800 | OTTA | 240 R | 1910 | 1940 | 30 | 1 | 0.5 | | |
| | 2800 | OTTA | 24P R | 1940 | | 300 D | 1 | | | |
| 6 | 2800 | OTTA | 20 GRF | 1958 | 2005 | 37 | 0.8 | 0.4 | | |
| 7 | 2800 | OTTA | 20 GRF | 1500 | 1615 | 210 | 2 | 1 | | |
| 11 | 2800 | OTTA | 21 GRF | 1211 | 1215 | 11 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 1 S | 1211.5 | 1212 | 1 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 27A RF | 1425 | | 335 | 1.4 | 1.2 | | |
| | 2800 | OTTA | 24 R | 1425 | 1515 | 50 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 45 C | 1437 | 1441 | 7 | 1.6 | 0.8 | | |
| | 2695 | SGMR | 20 GRF | 1437.6 | 1441.1 | 10.5 | 5 | 1.5 | | 1 |
| | 2800 | OTTA | 24P R | 1515 | | 175 | 1.4 | | | |
| | 2800 | OTTA | 26 FAL | 1810 | 2000 | 110 | 1.4 | | | |
| | 2800 | OTTA | 21 GRF | 2104 | 2140 | 110 D | 3.8 | | | |
| | 2800 | OTTA | 1A S | 2112 | 2115.5 | 9 | 1.8 | 0.9 | | |
| | 2800 | OTTA | 1 S | 2116 | 2117 | 2 | 3.6 | 1.8 | | |
| 12 | 8800 | MANI | 46 C | 0946.4 | 0953 U | 10.6U | 490 U | 136 U | | SUNSET 1 |
| | 2695 | MANI | 4 S/F | 0946.8 | 0950.94 | 10.24 | 260 U | 54 U | | SUNSET 1 |
| 13 | 2800 | OTTA | 21 GRF | 1126 | 1130 | 56 | 2.2 | 1.8 | | |
| | 2800 | OTTA | 1 S | 1126.1 | 1127 | 1 | 2.6 | 1.3 | | |
| | 2800 | OTTA | 27 RF | 1228 | | 177 | 2.2 | 1.6 | | |
| | 2800 | OTTA | 24 R | 1228 | 1240 | 12 | 2.2 | 1.1 | | |
| | 2800 | OTTA | 24P R | 1240 | | 78 | 2.2 | | | |
| | 2800 | OTTA | 26 FAL | 1358 | 1525 | 87 | -2.2 | -1.4 | | |
| | 2800 | OTTA | 240 R | 1548 | 1615 - | 27 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 27AFRF | 1718 | | 422 | 2.6 | | | |
| | 2800 | OTTA | 24 R | 1718 | 1725 | 7 | 2.1 | 0.5 | | |
| | 2695 | SGMR | 20 GRF | 1718.2 | 1742.6 | 63.8U | 6.9 | 4.1U | | SWF 1 |
| | 8800 | SGMR | 20 GRF | 1718.2 | 1756.6 | 63.8U | 13.3 | 8 U | | SWF 1 |
| | 2800 | OTTA | 24P R | 1725 | | 383 | 2.1 | | | |
| | 2800 | OTTA | 1 S | 1742 | 1742.5 | 1 | 1 | 0.5 | | |
| | 2800 | OTTA | 32A ABS | 2130 | 2202 | 70 | -4.2 | -2.1 | | |
| | 2800 | OTTA | 4 S/F | 2205 | 2206.5 | 6 | 10 | 2.6 | | |
| | 2695 | BOUL | 3 S | 2206.5 | 2207.5 | 4.5 | 9 | 3 | | |
| | 8800 | MANI | 45 C | 2330.4 | 2336 | 7.6 | 39 | 12.2 | | 1 |
| | 2695 | PENT | 26 FAL | 2348 | 2420 | 32 | -2.6 | -1.3 | | |
| 14 | 2695 | PENT | 240 R | 0030 | 0110 | 40 | 2.8 | 1.4 | | |
| | 2695 | MANI | 40 F | 0541 | 0555.7 | 18.2 | 105 | 22.3 | | 1 |
| | 2695 | SGMR | 20 GRF | 1604 | 1621 | 34.5 | 4.1 | 2.5 | | 1 |
| | 2800 | OTTA | 20 GRF | 1615 | 1623 | 25 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 27A RF | 1825 | | 105 | 1.4 | 1.1 | | |
| | 2800 | OTTA | 24 R | 1825 | 1840 | 15 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 20 GRF | 1829 | 1834 | 13 | 1.8 | 0.8 | | |
| | 2800 | OTTA | 24P R | 1840 | | 60 | 1.4 | | | |
| | 2800 | OTTA | 26 FAL | 1940 | 2010 | 30 | -1.4 | -0.7 | | |
| 15 | 2800 | OTTA | 20 GRF | 1125 | 1150 | 85 | 2.6 | 1.3 | | |
| | 2800 | OTTA | 20 GRF | 1300 | 1320 | 60 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 27AFRF | 1400 | | 320 | 2.4 | 1.8 | | |
| | 2800 | OTTA | 24 R | 1400 | 1520 | 80 | 2.4 | 1.2 | | |
| | 2800 | OTTA | 24P R | 1520 | | 157 | 2.4 | | | |
| | 2800 | OTTA | 1 S | 1705 | 1705.8 | 6 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 20 GRF | 1720 | 1745 | 32 | 0.8 | 0.6 | | |
| | 2800 | OTTA | 26 FAL | 1757 | 1920 | 83 | -2.4 | -1.2 | | |
| 16 | 2800 | OTTA | 23 GRF | 1124 | 1145 | 86 | 2.4 | 1.6 | | |
| | 2800 | OTTA | 1 S | 1143.2 | 1144 | 1 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 27 RF | 1324 | | 158 | 1.2 | 0.9 | | |
| | 2800 | OTTA | 24 R | 1324 | 1350 | 26 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 24P R | 1350 | | 75 | 1.2 | | | |
| | 2800 | OTTA | 26 FAL | 1505 | 1602 | 57 | -1.2 | -0.6 | | |
| | 2800 | OTTA | 20 GRF | 1610 | 1640 | 60 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 21 GRF | 1720 | 1730 | 65 | 3 | 1.2 | | |
| | 2695 | SGMR | 22 GRF | 1725.2 | 1729.6 | 60 U | 11 | 6.6U | | 2 |
| | 2695 | BOUL | 3 S | 1726 | 1729.5 | 15 | 7 | 2 | | |
| | 2800 | OTTA | 1 S | 1727.5 | 1728.5 | 2.5 | 6.6 | 2.2 | | |
| | 8800 | SGMR | 22 GRF | 1727.7 | 1733.4 | 60 U | 10.3 | 6.2U | | 2 |
| | 2800 | OTTA | 21 GRF | 2106 | 2114 | 80 | 9 | 4.3 | | |
| | 2800 | OTTA | 46F C | 2108 | 2111 | 5.8 | 15.4 | 6.2 | | |
| | 2800 | OTTA | 1 S | 2243 | 2244.5 | 2.5 | 1.2 | 0.6 | | |
| | 2695 | SGMR | 22 GRF | 2247.8 | 2316.4 | 34.2D | 8.5U | 5.1U | | 3 |
| | 2695 | PENT | 21 GRF | 2300 | | 170 D | 11.2 | | | |
| | 2695 | PENT | 21 GRF | 2308 | 2329 | 55 | 5.2 | 2.6 | | |
| | 2695 | PENT | 45 C | 2310.8 | 2316.3 | 11 | 17.8 | 8.2 | | |
| | 2695 | MANI | 4 S/F | 2311.2 | 2314.3 | 15.8 | 22.8 | 6 | | 1 |

# SOLAR RADIO EMISSION
# SELECTED FIXED FREQUENCY EVENTS

**APRIL 1977**

| | FREQUENCY | STATION | TYPE | STARTING TIME | TIME OF MAXIMUM | DURATION | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ | | INT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | UT | UT | MINUTES | PEAK | MEAN | | |
| | 2695 | BOUL | 45 C | 2312.5 | 2317.5 | 10 | 17 | 6 | | |
| 17 | 2800 | OTTA | 26A FAL | 1205 | 1855 | 410 | 4 | 2 | | |
| | 2800 | OTTA | 32 ABS | 1215 | 1335 | 140 | -4.4 | -2.2 | | |
| | 2800 | OTTA | 20 GRF | 2100 | 2115 | 62 | 1 | 0.5 | | |
| | 2800 | OTTA | 21 GRF | 2210 | 2220 | 22 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 1 S | 2210.5 | 2211 | 1.5 | 1.4 | 0.9 | | |
| 18 | 2800 | OTTA | 20 GRF | 1725 | 1758 | 125 | 1.8 | 0.9 | | |
| 19 | 2800 | OTTA | 21 GRF | 1457 | 1524 | 200 | 3.8 | 1.9 | | |
| | 2800 | OTTA | 1 S | 1509.1 | 1510.1 | 5 | 1.6 | 0.8 | | |
| | 2800 | OTTA | 20 GRF | 1940 | 1950 | 25 | 1.4 | 0.7 | | |
| 20 | 2800 | OTTA | 21 GRF | 1625 | 1645 | 225 | 4 | 2.7 | | |
| | 2800 | OTTA | 2 S/F | 1638 | 1638.2 | 1 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 27 RF | 2050 | | 175 | 1.4 | 1.1 | | |
| | 2800 | OTTA | 24 R | 2050 | 2125 | 35 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 24P R | 2125 | | 105 | 1.4 | | | |
| | 2695 | PENT | 26 FAL | 2310 | 2345 | 35 | -1.4 | -0.7 | | |
| 21 | 2800 | OTTA | 2 S/F | 1348.5 | 1348.9 | 3 | 7.8 | 2 | | |
| | 2695 | BOUL | 45 C | 1350 | 1351.5 | 1.5 | 8 | 3 | | |
| | 2800 | OTTA | 27A RF | 1440 | | 190 | 0.8 | 0.6 | | |
| | 2800 | OTTA | 24 R | 1440 | 1505 | 25 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 24P R | 1505 | | 115 | 0.8 | | | |
| | 2695 | SGMR | 1 S | 1534.9 | 1538.7 | 4.5 | 5.3 | 1.6 | 3 | 1 |
| | 2800 | OTTA | 1 S | 1537.5 | 1538.8 | 2 | 3.6 | 1.8 | | |
| | 2695 | BOUL | 1 S | 1539 | 1539.5 | 2 | 3 | 1 | | |
| | 2800 | OTTA | 45 C | 1628.7 | 1629 | 1 | 3.6 | 1.8 | | |
| | 2800 | OTTA | 26 FAL | 1700 | 1750 | 50 | -0.8 | -0.4 | | |
| | 2800 | OTTA | 6 S | 1830.7 | 1831.2 | 0.6 | 0.8 | | | |
| | 2800 | OTTA | 1 S | 2040 | 2041.5 | 3 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 20 GRF | 2102 | 2103 | 18 | 1 | 0.5 | | |
| | 2800 | OTTA | 1 S | 2118.8 | 2119 | 1 | 2 | 1 | | |
| | 2695 | PENT | | 2118.8 | 2119 | 1 | | | | |
| | 2800 | OTTA | 20 GRF | 2121 | 2138 | 70 | 1.4 | 0.7 | | |
| 22 | 2695 | MANI | 3 S | 0127.3 | 0128.5 | 4.3 | 28.6 | 11.4 | | 1 |
| | 2695 | PENT | 1 S | 0127.8 | 0128.5 | 2 | 7 | 3.2 | | |
| | 2800 | OTTA | 27A RF | 1135 | | 345 | 1.2 | 1.1 | | |
| | 2800 | OTTA | 24 R | 1135 | 1205 | 30 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 24P R | 1205 | | 295 | 1.2 | | | |
| | 2800 | OTTA | 20 GRF | 1410 | 1420 | 30 | 1 | 0.7 | | |
| | 2800 | OTTA | 26 FAL | 1700 | 1720 | 20 | -1.2 | -0.6 | | |
| | 2800 | OTTA | 32 ABS | 1730 | 1840 | 140 | -1.4 | -0.9 | | |
| 30 | 2800 | OTTA | 240 R | 1320 | 1350 | 30 | 1 | 0.5 | | |
| | 2800 | OTTA | 24P R | 1350 | | 540 D | 1 | | | |
| | 2800 | OTTA | 20 GRF | 1405 | 1455 | 145 | 1.4 | 0.7 | | |

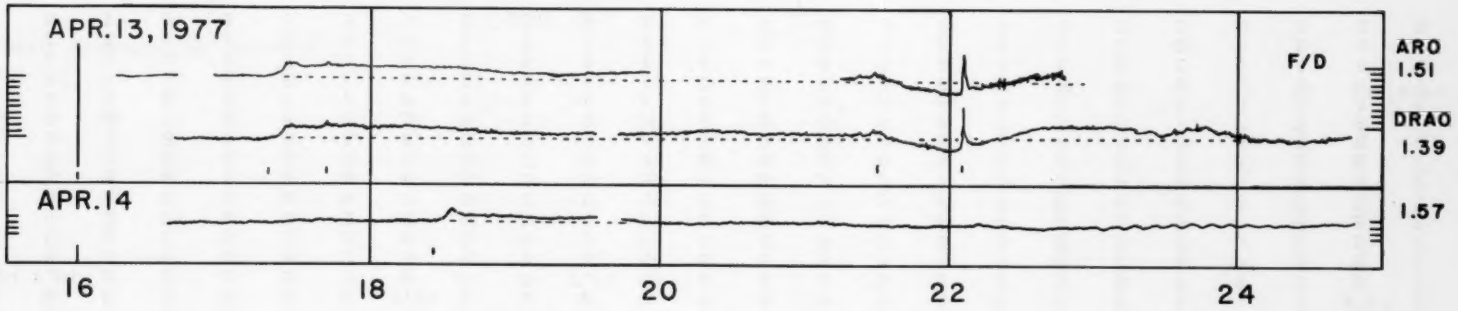
Observatories:

BOUL = Boulder  MANI = Manila  OTTA = Ottawa ARO  PENT = Penticton  SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

# SELECTED SOLAR NOISE BURSTS




## DESCRIPTION OF BURSTS FOR APR. 13-14,1977

| | START | TYPE | DURATION | INTENSITY |
|---|---|---|---|---|
| APR.13 | 17:18 | RISE AND FALL F | 422 | 3.6 |
| | 17:42 | SIMPLE | 1 | 1.0 |
| | 21:30 | ABSORPTION | 70 | -4.2 |
| | 22:05 | SIMPLE F | 6 | 10.0 |
| APR.14 | 18:25 | RISE AND FALL | 105 | 1.4 |
| | 18:25 | SIMPLE | 13 | 1.8 |

------ REFERENCE QUIET SUN LEVELS

Selected 2800 MHz Solar Noise Bursts A.R.O. Ottawa, Ont.

Selected 2695 MHz Solar Noise Bursts D.R.A.O. Penticton, B.C.

19 Apr 77

# SOLAR X-RAYS BY SATELLITE
## SMS GOES
### APRIL 1977

.5 - 4Å Hourly Averages ($10^{-5}$ watts/$m^2$)

| MO DA | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/ 1 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 2 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 3 | B | B | B | B | M | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 4 | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 5 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 6 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 7 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 8 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 9 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/10 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/11 | B | B | B | B | B | M | M | M | M | M | M | M | M | B | B | B | B | B | B | B | B | .04 | B | B | B |
| 4/12 | B | B | B | B | B | B | B | B | B | .24 | .14 | B | B | B | B | B | B | B | B | B | B | B | B | B | .22 |
| 4/13 | B | B | B | B | B | B | B | B | B | B | B | B | .01 | B | B | B | B | .03 | .01 | B | B | .02 | .04 | .07 | B |
| 4/14 | B | B | B | B | B | .12 | .03 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/15 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/16 | B | B | B | B | B | B | B | .01 | B | B | B | B | B | B | B | B | B | B | B | B | B | .02 | B | .07 | B |
| 4/17 | .04 | .01 | B | B | B | B | B | B | B | B | .01 | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/19 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/20 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/21 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/22 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/23 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/25 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/26 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/27 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/28 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/29 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/30 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

# SOLAR X-RAYS BY SATELLITE
## SMS GOES
### APRIL 1977

**1 - 8Å Hourly Averages ($10^{-4}$ watts/$m^2$)**

| MO DA | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/ 1 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 2 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 3 | B | B | B | B | M | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 4 | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 5 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 6 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 7 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 8 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/ 9 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/10 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/11 | B | B | B | B | B | M | M | M | M | M | M | M | M | B | B | B | B | B | B | B | B | 0.04 | 0.01 | B | B |
| 4/12 | B | B | B | B | B | B | B | B | B | 0.11 | 0.13 | 0.02 | 0.01 | B | B | B | B | B | B | B | B | B | B | B | 0.02 |
| 4/13 | B | B | B | B | B | B | B | B | B | B | B | B | 0.01 | 0.01 | B | B | B | 0.03 | 0.02 | B | B | 0.03 | 0.04 | 0.06 | B |
| 4/14 | B | B | B | B | B | 0.08 | 0.04 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/15 | B | B | B | B | B | B | B | B | B | 0.01 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/16 | B | B | B | B | B | B | B | 0.02 | 0.01 | B | B | B | B | B | 0.03 | B | B | B | B | B | B | 0.03 | B | 0.06 | B |
| 4/17 | 0.06 | 0.03 | 0.02 | 0.02 | B | B | B | B | B | B | 0.01 | 0.01 | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/19 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 0.01 | B | B | B | B | B | B | B | B | B |
| 4/20 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/21 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/22 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/23 | B | B | B | B | B | B | B | B | B | B | B | B | 0.04 | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/25 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/26 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/27 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/28 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/29 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 4/30 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

# SOLAR X-RAYS BY SATELLITE

GOES-1

## APRIL 1977

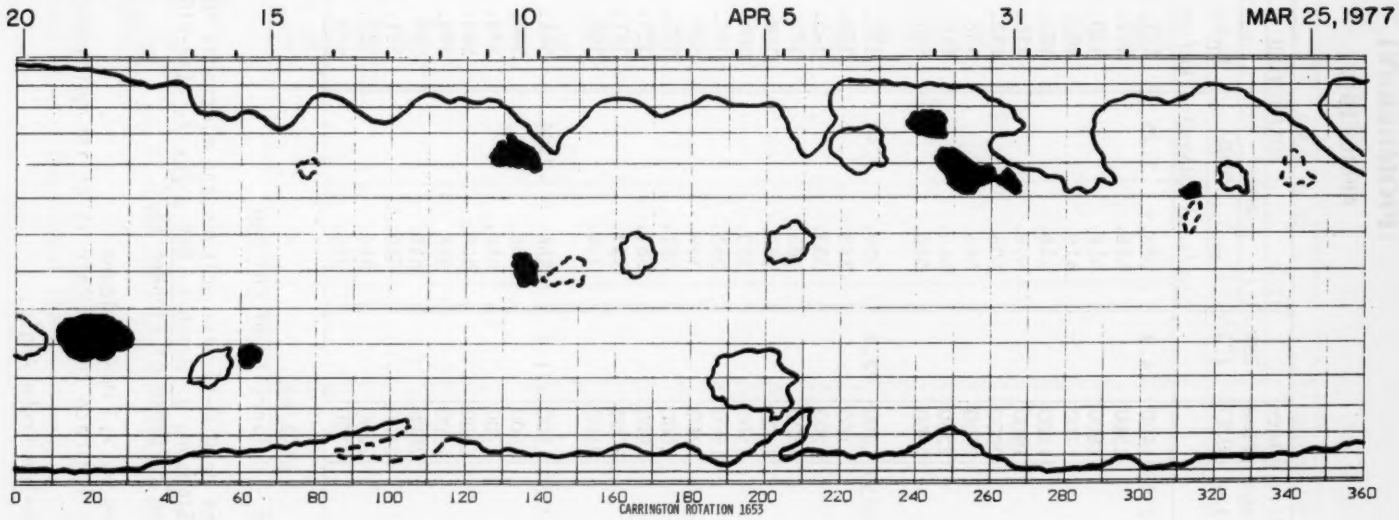
| DAY | BEGIN TIME | .5-4A $Wm^{-2}$ | 1-8A $Wm^{-2}$ | MAX TIME | .5-4A $Wm^{-2}$ | 1-8A $Wm^{-2}$ | 1/2P TIME | .5-4A $Wm^{-2}$ | 1-8A $Wm^{-2}$ |
|---|---|---|---|---|---|---|---|---|---|
| 13 | 0608 | 7.4E-06 | 3.8E-04 | 0611 | 1.9E-04 | 1.7E-03 | 0614 | 5.4E-05 | 1.0E-03 |
| 13 | 1126 | 3.6E-06 | 3.2E-04 | 1133 | 9.4E-05 | 1.6E-03 | 1140 | 2.8E-05 | 9.6E-04 |
| 13 | 1227 | 4.8E-05 | 9.5E-04 | 1230 | 1.1E-04 | 1.9E-03 | 1232 | 1.1E-04 | 1.4E-03 |
| 13 | 1338 | 2.6E-05 | 9.0E-04 | 1349 | 1.1E-04 | 1.9E-03 | 1355 | 5.2E-05 | 1.3E-03 |
| 13 | 1718 | 8.6E-06 | 4.0E-04 | 1750 | 8.5E-04 | 7.1E-03 | 1809 | 2.2E-04 | 3.6E-03 |
| 13 | 2120 | 7.6E-06 | 4.1E-04 | 2136 | 1.1E-03 | 9.3E-03 | 2143 | 2.3E-04 | 4.8E-03 |
| 13 | 2331 | 9.2E-06 | 6.2E-04 | 2343 | 4.2E-03 | 2.7E-02 | 2348 | 9.1E-04 | 1.3E-02 |
| 14 | 0531 | 1.3E-07 | 1.8E-04 | 0548 | 5.2E-03 | 3.0E-02 | 0559 | 1.6E-03 | 1.5E-02 |
| 14 | 1616 | 2.6E-07 | 2.1E-04 | 1624 | 6.8E-05 | 1.0E-03 | 1629 | 1.0E-05 | 5.7E-04 |
| 14 | 2104 | 3.5E-06 | 2.3E-04 | 2110 | 1.8E-04 | 1.9E-03 | 2114 | 2.8E-05 | 8.3E-04 |
| 14 | 2208 | 0.0E+00 | 2.0E-04 | 2212 | 2.2E-04 | 1.9E-03 | 2218 | 3.3E-05 | 9.1E-04 |
| 15 | 0151 | 8.7E-06 | 2.3E-04 | 0207 | 8.8E-05 | 1.9E-03 | 0216 | 4.6E-05 | 1.0E-03 |
| 15 | 0509 | 0.0E+00 | 2.0E-04 | 0543 | 8.6E-05 | 1.6E-03 | 0601 | 2.3E-05 | 9.1E-04 |
| 15 | 0848 | 1.3E-05 | 4.9E-04 | 0859 | 5.6E-04 | 4.5E-03 | 0913 | 1.1E-04 | 2.4E-03 |
| 16 | 0710 | 2.1E-05 | 4.1E-04 | 0743 | 1.7E-04 | 2.4E-03 | 0816 | 6.1E-05 | 1.4E-03 |
| 16 | 1139 | 0.0E+00 | 1.7E-04 | 1151 | 7.4E-05 | 1.1E-03 | 1207 | 2.0E-05 | 6.4E-04 |
| 16 | 1721 | 0.0E+00 | 9.6E-05 | 1731 | 3.0E-04 | 2.9E-03 | 1742 | 5.7E-05 | 1.3E-03 |
| 16 | 2104 | 3.0E-06 | 1.9E-04 | 2116 | 8.2E-04 | 8.2E-03 | 2127 | 2.1E-04 | 4.0E-03 |
| 16 | 2302 | 8.6E-06 | 3.0E-04 | 2317 | 1.6E-03 | 1.3E-02 | 2337 | 7.1E-04 | 6.9E-03 |
| 17 | 1037 | 0.0E+00 | 1.1E-04 | 1050 | 5.9E-04 | 6.1E-03 | 1101 | 1.9E-04 | 3.0E-03 |
| 17 | 2208 | 0.0E+00 | 6.5E-05 | 2215 | 8.6E-05 | 1.3E-03 | 2219 | 2.7E-05 | 7.1E-04 |
| 19 | 0715 | 0.0E+00 | 3.7E-05 | 0741 | 4.0E-04 | 3.8E-03 | 0751 | 1.0E-04 | 1.8E-03 |
| 19 | 1415 | 0.0E+00 | 4.3E-06 | 1513 | 2.0E-04 | 2.2E-03 | 1536 | 4.2E-05 | 1.1E-03 |
| 20 | 1543 | 0.0E+00 | 3.4E-05 | 1645 | 5.8E-05 | 1.1E-03 | 1752 | 8.9E-06 | 5.5E-04 |

Errata: The January - April 1977 X-ray event flux data appearing in SGD issues 390, 391, 392, and 393 Part I are 1000 times too large. A computer programming error printed the data in units of Ergs/$cm^2$/s instead of Watts/$m^2$/s.

# HELIUM 10830Å SYNOPTIC MAPS

## CARRINGTON ROTATION 1653

KITT PEAK NATIONAL OBSERVATORY




23 Apr 77

# PIONEER VI

## APRIL 1977

| Date Apr. 1977 | DSN Coverage (UT) | Data Time (UT) | ESP (°) | SOLAR WIND AMES[1] $U_{H^+}$ (km/sec) | AMES[1] TAU (days) | MIT $U_{H^+}$ (km/sec) | MIT $N_{H^+}$ ($H^+$/cc) | COSMIC RAY PROTONS[2] (particles/sec) 6-13 (Mev*) | 13-175 (Mev**) | >175 (Mev) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1433-2300 | 1400 | 24.9 | 383.† | 2.25 | 401. | 44.9 | 0.52 | 0.15 | 1.59 |
| | | 1500 | | 416. | | 402. | 50.2 | .51 | .14 | 1.64 |
| | | 1600 | | 416. | | 420. | 58.4 | .39 | .13 | 1.63 |
| | | 1700 | | 416. | | 402. | 44.1 | .55 | .14 | 1.63 |
| | | 1800 | | 448. | | 422. | 40.1 | 1.03 | .16 | 1.39 |
| | | 1900 | | 506. | | 456. | 31.7 | .48 | .13 | 1.57 |
| | | 2000 | | 506. | | 472. | 33.1 | .56 | .13 | 1.61 |
| | | 2100 | | 566. | | 556. | 14.2 | .87 | .14 | 1.6 |
| | | 2200 | | 566. | | 616. | 10.8 | 1.1 | .14 | 1.8 |
| | | 2300 | | 566. | | 589. | 10.6 | 1.3 | .14 | 1.57 |
| 25 | 1077-2055 | 1000 | 22.9 | 339. | 2.44 | 358. | 18. | 0.52 | 0.14 | 1.68 |
| | | 1100 | | 383. | | 358. | 19.3 | .5 | .15 | 1.72 |
| | | 1200 | | 383. | | 345. | 11.1 | .48 | .13 | 1.52 |
| | | 1300 | | 383. | | 372. | 14.6 | .55 | .14 | 1.64 |
| | | 1400 | | 383. | | 369. | 13.1 | .53 | .15 | 1.61 |
| | | 1500 | | 383. | | 366. | 13.7 | .49 | .15 | 1.63 |
| | | 1600 | | 361. | | 351. | 14.5 | .51 | .11 | 1.61 |
| | | 1700 | | 339. | | 354. | 12.1 | .52 | .13 | 1.66 |
| | | 1800 | | 361. | | 351. | 13.4 | .5 | .14 | 1.61 |
| | | 1900 | | 361. | | 359. | 13.6 | .46 | .13 | 1.66 |
| | | 2000 | | 339. | | 347. | 12.9 | .45 | .12 | 1.59 |
| | | 2100 | | 339. | | 364. | 15.7 | .48 | .13 | 1.59 |
| 30 | 1443-2250 | 1500 | 21.2 | 566. | 2.06 | 544. | 10.2 | 185. | 0.15 | 1.64 |
| | | 1600 | | 566. | | 546. | 6.4 | 308. | .14 | 1.61 |
| | | 1700 | | 566. | | 533. | 7.4 | 408. | .13 | 1.61 |
| | | 1800 | | 566. | | 563. | 8.4 | 494. | .12 | 1.61 |
| | | 1900 | | 566. | | 573. | 8.4 | 591. | .15 | 1.59 |
| | | 2000 | | 566. | | 577. | 10.2 | 549. | .16 | 1.61 |
| | | 2100 | | 566. | | 531. | 9. | 451. | .15 | 1.66 |
| | | 2200 | | 566. | | 528. | 13.9 | 116. | .12 | 1.41 |
| | | 2300 | | 566. | | --- | --- | 137. | .17 | 1.46 |

[1] Wolfe - NASA/ARC
[2] Simpson - University of Chicago

* Includes He 0.6-13 Mev/nucleons and electrons ∿0.5 Mev - see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleons.
Q Used to indicate that a rate is at its quiescent level.

ESP = Earth-Sun Probe Angle.

† Peak velocity

Note: Data sampled hourly unless otherwise noted.

Note: This coverage was obtained as a result of PN-6 alignment with Helios.

# PIONEER VII

## APRIL 1977

| Date Apr. 1977 | DSN Coverage (UT) | Data Time (UT) | ESP (°) | SOLAR WIND AMES[1] $U_{H^+}$ (km/sec) | SOLAR WIND AMES[1] TAU (days) | SOLAR WIND MIT[2] $U_{H^+}$ (km/sec) | SOLAR WIND MIT[2] $N_{H^+}$ ($H^+$/cc) | COSMIC RAY PROTONS[3] (particles/sec) 6-13 (Mev*) | 13-175 (Mev**) | >175 (Mev) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 2201-2400 | 2200 | 10.7 | 388.† | 0.48 | | | | | |
| | | 2300 | | 388. | | | | | | |
| | | 2400 | | 388. | | | | | | |
| 16 | 0000-0145 | 0000 | | 388. | | | | | | |
| | | 0100 | | 388. | | | | | | |
| | | 0200 | | 388. | | | | | | |
| 20 | 1901-2400 | 1900 | 11.2 | 500. | 0.61 | | | | | |
| | | 2000 | | 500. | | | | | | |
| | | 2100 | | 500. | | | | | | |
| | | 2200 | | 500. | | | | | | |
| | | 2300 | | 500. | | | | | | |
| | | 2400 | | 500. | | | | | | |
| 21 | 0000-0100 | 0000 | | 500. | | | | | | |
| | | 0100 | | 500. | | | | | | |
| 24 | 1404-2329 | 1400 | 11.6 | 388. | 0.62 | | | | | |
| | | 1500 | | 388. | | | | | | |
| | | 1600 | | 388. | | | | | | |
| | | 1700 | | 388. | | | | | | |
| | | 1800 | | 388. | | | | | | |
| | | 1900 | | 414. | | | | | | |
| | | 2000 | | 440. | | | | | | |
| | | 2100 | | 440. | | | | | | |
| | | 2200 | | 440. | | | | | | |
| | | 2300 | | 440. | | | | | | |
| 29 | 1444-0000 | 1400 | 11.9 | 363. | 0.65 | | | | | |
| | | 1500 | | 388. | | | | | | |
| | | 1600 | | 388. | | | | | | |
| | | 1700 | | 388. | | | | | | |
| | | 1800 | | 388. | | | | | | |
| | | 1900 | | 388. | | | | | | |
| | | 2000 | | 388. | | | | | | |
| | | 2100 | | 388. | | | | | | |
| | | 2200 | | 388. | | | | | | |
| | | 2300 | | 388. | | | | | | |
| | | 2400 | | 388. | | | | | | |

[1] Wolfe - NASA/ARC
[2] Simpson - University of Chicago

* Includes He 0.6-13 Mev/nucleons and electrons ~0.5 Mev - see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleons.
Q Used to indicate that a rate is at its quiescent level.

ESP = Earth-Sun Probe Angle.

† Peak velocity.

Note: Data sampled hourly unless otherwise noted.

# PIONEER IX

## APRIL 1977

| Date Apr. 1977 | DSN Coverage (UT) | Data Time (UT) | ESP (°) | SOLAR WIND[1] | | | | IP E-FIELD[2] | IMF[3] | | COSMIC RAY PROTONS[4] (particles/sec) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $U_{H^+}$ (km/sec) | $N_{H^+}$ ($H^+$/cc) | $T_{H^+}$ ($\times 10^{6}$°K) | TAU (days) | 400 Hz (mv) | \|B\| (γ) | $\phi$ (°) | >13.9 Mev | >40 Mev |
| 27 | 0951-2007 | 1000 | 42.7 | 542.* | | | 3.94 | ---- | 9.7 | 352. | --- | --- |
| | | 1100 | | 542. | | | | 0.217 | 9.6 | 353. | 6.92 | 0.62 |
| | | 1200 | | 523. | | | | .171 | 10.5 | 358. | 6.7 | .52 |
| | | 1300 | | 504. | | | | .252 | 8.8 | 351. | 6.76 | .59 |
| | | 1400 | | 504. | | | | .163 | 8.3 | 001. | 6.77 | .56 |
| | | 1500 | | 504. | | | | .121 | 8.4 | 359. | 6.78 | .69 |
| | | 1600 | | 486. | | | | .172 | 8.3 | 006. | 6.85 | .57 |
| | | 1700 | | 504. | | | | .136 | 7.7 | 359. | 6.76 | .46 |
| | | 1800 | | 504. | | | | .25 | 8.7 | 337. | 6.72 | .39 |
| | | 1900 | | 504. | | | | .22 | 6.5 | 328. | 6.82 | .63 |
| | | 2000 | | 523. | | | | .253 | 8.9 | 003. | 8.34 | .56 |
| | | 2100 | | 504. | | | | .242 | 6.1 | 320. | 6.83 | .59 |
| | | 2200 | | 523. | | | | .267 | 7.1 | 299. | 6.84 | .59 |

[1] Wolfe - NASA/ARC
[2] Scarf - TRW, Inc.
[3] Sonett and Colburn - NASA/ARC
[4] Webber - Univ. of N.H.

* Peak velocity

Note: Data sampled hourly unless otherwise noted.

ESP = Earth-Sun Probe Angle.

Note: This coverage was obtained as a result of PN-9 alignment with Helios.

# SOLAR WIND

## Interplanetary Scintillations

### APRIL 1977

UCSD 74 MHZ SCINTILLATIONS

| DAY | 3C48 | | 3C144 | | 3C147 | | 3C161 | | 3C237 | | 3C273 | | 3C298 | | 3C459 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR |
| 1 | 544 | 6 | | | 391 | 70 | | | | | | | | | 412 | 99 |
| 2 | 485 | 14 | 302 | 25 | | | | | | | | | | | 400 | 37 |
| 3 | 516 | 16 | 514 | 3 | | | | | 382 | 40 | | | | | 340 | 60 |
| 4 | 410 | 5 | 475 | 8 | 376 | 61 | | | | | | | | | 239 | 11 |
| 5 | 453 | 3 | 440 | 30 | 275 | 22 | 489 | 10 | | | | | | | | |
| 6 | 368 | 2 | 431 | 13 | | | 519 | 18 | | | | | | | 297 | 21 |
| 7 | 526 | 16 | 418 | 28 | | | | | | | | | 595 | 43 | | |
| 8 | 580 | 18 | 371 | 2 | 373 | 11 | 452 | 3 | | | | | 599 | 37 | 200 | 7 |
| 9 | | | 298 | 10 | | | | | 486 | * | | | 405 | 38 | | |
| 10 | 593 | 2 | | | | | 600 | 68 | | | | | | | 378 | 58 |
| 11 | 572 | 1 | 382 | 13 | | | | | | | | | | | 540 | 29 |
| 12 | 453 | 6 | 318 | 15 | | | 369 | 32 | | | | | | | 352 | 42 |
| 13 | 563 | 16 | 312 | 18 | | | | | | | | | | | 347 | 43 |
| 14 | 566 | 10 | 290 | 0 | | | | | | | | | | | 323 | 7 |
| 15 | 600 | 14 | 311 | 2 | | | 367 | 6 | | | | | | | 268 | 10 |
| 16 | 596 | 38 | 334 | 3 | | | 527 | 76 | | | 359 | 46 | 359 | 3 | 428 | 4 |
| 17 | 477 | 18 | 430 | 7 | 360 | 1 | 635 | 67 | | | | | | | 401 | 5 |
| 18 | 501 | 27 | 403 | 1 | | | 478 | 29 | | | | | 394 | 39 | 406 | 14 |
| 19 | 590 | 10 | 395 | 12 | | | 435 | 118 | 400 | 72 | 515 | 37 | 505 | 50 | 432 | 58 |
| 20 | 648 | 5 | 292 | 4 | 413 | 97 | 460 | 37 | | | 462 | 66 | | | 388 | 2 |
| 21 | 614 | 7 | 270 | 6 | | | | | | | | | | | 321 | 41 |
| 22 | 573 | 4 | | | 370 | 51 | 481 | 8 | | | | | | | 358 | 0 |
| 23 | 572 | 4 | 289 | 3 | | | 410 | 0 | | | | | | | 323 | 50 |
| 24 | 622 | 30 | 304 | 0 | 408 | 20 | | | | | | | | | 389 | 2 |
| 25 | 665 | 21 | 314 | 0 | | | 373 | 3 | | | | | | | 331 | 22 |
| 26 | 677 | 27 | 371 | 11 | | | 399 | 12 | | | | | | | 447 | 25 |
| 27 | 706 | 46 | 319 | 5 | | | 353 | 2 | | | | | | | 490 | 8 |
| 28 | 626 | 9 | 356 | 5 | | | 400 | 8 | | | | | | | | |
| 29 | 669 | 0 | 414 | 0 | 521 | 36 | 533 | 40 | 276 | 32 | 514 | 6 | | | 356 | 20 |
| 30 | 590 | 14 | | | | | | | | | | | | | | |

| APRIL | 5 | | | | 15 | | | | 25 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LAT | DIST | DLON | UT | LAT | DIST | DLON | UT | LAT | DIST | DLON |
| 3C48 | 21. | 36. | 0.47 | -48. | 20. | 51. | 0.39 | -41. | 20. | 63. | 0.36 | -6. |
| 3C144 | 1. | -7. | 0.92 | -23. | 0. | -7. | 0.85 | -32. | 23. | -8. | 0.74 | -42. |
| 3C147 | 24. | 1. | 0.95 | -16. | 23. | 5. | 0.90 | -24. | 23. | 11. | 0.82 | -31. |
| 3C161 | 2. | -15. | 1.00 | -15. | 2. | -15. | 0.96 | -15. | 1. | -19. | 0.91 | -20. |
| 3C237 | 6. | -7. | 1.23 | -10. | 5. | -7. | 1.20 | -12. | 4. | -6. | 1.16 | -13. |
| 3C273 | 8. | -5. | 1.30 | -3. | 7. | -4. | 1.28 | -5. | 6. | -4. | 1.27 | -7. |
| 3C298 | 10. | -1. | 1.28 | 3. | 9. | -1. | 1.29 | 0. | 8. | 0. | 1.29 | -2. |
| 3C459 | 18. | 16. | 0.44 | 60. | 18. | 11. | 0.58 | 52. | 17. | 8. | 0.71 | 43. |

NOTE:

* indicates data for which no error estimate is available since only two antennas were operating.

3C147 observed at 0 hr. UT until April 9, at 23 hr. UT after April 9.

3C144 observed at 0 hr. UT until April 23, at 23 hr. UT after April 23.

# INFERRED IP MAGNETIC FIELD

| BARTELS ROTATION | DATE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1944 | SEP 27 | | | | | | | – | – | – | A* | | | * | AT | | | | AT* | | | | | | | | TA | – |
| 1945 | OCT 24 | | | | | | TA | * | | | | A* | * | | * | AT– | AT– | AT | AT | | | | | | * | | | |
| 1946 | NOV 20 | | * | | TA | | T* | T* | | – | – | – | | * | * | | | | AT | AT | | | | | * | | | |
| 1947 | DEC 17 | – | | | | | | TA* | | | * | AT* | TA | | * | | | | T* | | * | | | | A* | TA* | * | |
| 1948 | 1976 JAN 13 | TA | T* | TA | | TA | TA | AT | | | – | – | * | | – | – | | – | – | | | | | | | | TA | |
| 1949 | FEB 9 | | | | – | – | | – | TA | | AT | A* | TA | | | | | | | T* | | | | | * | | TA | TA* |
| 1950 | MAR 7 | | | | | | | – | TA | A* | | TA | | | | | | * | * | AT | | | T* | | | TA | | |
| 1951 | APR 3 | | | | | | | * | | | | * | | | | | | | | AT | TA | T* | T* | | | A | TA | A* |
| 1952 | APR 30 | | AT | | | | | TA | AT | T* | – | | | – | – | – | | | A* | TA | AT | AT | | A* | | | – | |
| 1953 | MAY 27 | – | | | | | | * | TA | | | | | | – | * | | | – | | | | | T* | | | | |
| 1954 | JUN 23 | | | | | | AT | | | AT | | TA | T* | AT | | | TA | A* | | | | | AT | A* | | TA | AT | AT | A* |
| 1955 | JUL 20 | | T* | | | | | | | | TA | A* | | | | | | | | AT | T* | TA | TA | TA | – | TA | TA | | |
| 1956 | AUG 16 | | | | | | | TA | T* | | | | | | | * | | AT | | | | – | AT | – | AT | – | AT | – | TA | – | – | – | – |
| 1957 | SEP 12 | – | – | AT | – | | – | – | – | – | – | AT | – | – | AT | – | AT | – | – | – | – | – | | | | AT | | | | | – | | |
| 1958 | OCT 9 | AT* | A* | | A* | | * | | | | TA | A* | | | * | – | – | – | * | | TA | | AT | AT | | – | | | AT | | |
| 1959 | NOV 5 | | AT | TA | | | TA | T* | | * | AT* | | – | | * | – | | | | | | | | | | | | * | | | |
| 1960 | DEC 2 | | | | | | | TA | | * | | | | | | AT | | | * | | | | – | * | | – | TA | – | | | |
| 1961 | DEC 29 | – | AT | – | * | * | * | | AT | | | | * | | | * | A* | | * | * | | | | * | | | | | AT | | |
| 1962 | 1977 JAN 25 | | | – | | | | – | TA | | A* | | | AT | – | | * | – | | | * | | – | | | TA | | | | | |
| 1963 | FEB 21 | AT | – | – | – | – | TA | | TA | | | * | | | | | | | | | – | | | – | | | | | | | |
| 1964 | MAR 20 | | TA | | AT | | | | | * | | | – | – | | | | | | A* | | | | – | | | | | | |
| 1965 | APR 16 | | | TA | | TA | – | AT | TA | | TA | | AT | | | – | | | | | | | | | | | | | | | |

= definitely towards the sun  = definitely away from the sun

T = towards the sun  A = away from the sun  * = effect doubtful or not discernible  - = missing data

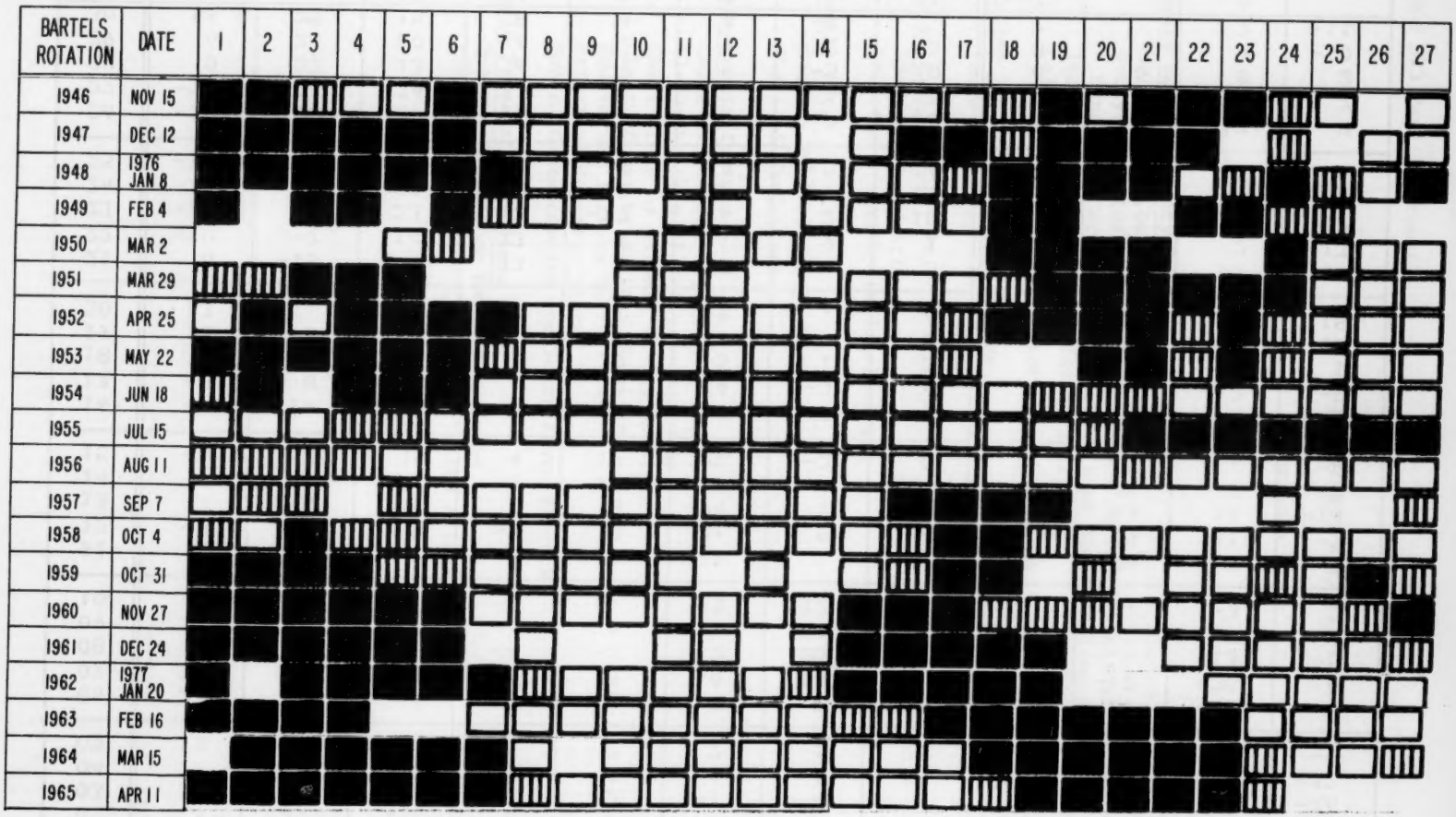
The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.

Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this table in SGD Issues 385 Part I through 389 Part I.
Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

# STANFORD MEAN SOLAR MAGNETIC FIELD




POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

Note: Data are taken daily at 2000 UT.

# STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)



| | 1976 | | | | | | | | 1977 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | JAN. | FEB. | MARCH | APRIL |
| DAY | | | | | | | | | | | | |
| 01 | -15 | 20 | 17 | 8 | 5 | . | -2 | -4 | . | 5 | 2 | -7 |
| 02 | 3 | 21 | 19 | 6 | 6 | . | -3 | -2 | . | 0 | 0 | -17 |
| 03 | 13 | 15 | 15 | 0 | 2 | -1 | -4 | 5 | 4 | -6 | -2 | -16 |
| 04 | 17 | 16 | 14 | -8 | 8 | 1 | 1 | 13 | 15 | -8 | -9 | -12 |
| 05 | 13 | 6 | 7 | -14 | 7 | 7 | 1 | 21 | . | -11 | -17 | -9 |
| 06 | 22 | 8 | -1 | -10 | 6 | -5 | 7 | 23 | 3 | -17 | -22 | -4 |
| 07 | 20 | 0 | -1 | -5 | 3 | 0 | 16 | 25 | -7 | -12 | -20 | 0 |
| 08 | 18 | . | 1 | -4 | -2 | 2 | 25 | 18 | -14 | . | -13 | 5 |
| 09 | 12 | . | 3 | -3 | 1 | 6 | 23 | 13 | -9 | . | -9 | 8 |
| 10 | 8 | -5 | 6 | -5 | . | 13 | 12 | 8 | -11 | . | -3 | 2 |
| 11 | 0 | -3 | 6 | 2 | 0 | 19 | . | -3 | -8 | 21 | 3 | -4 |
| 12 | -8 | 0 | 10 | -1 | 2 | 21 | 9 | -4 | . | 19 | 11 | -7 |
| 13 | -7 | -6 | 9 | 1 | 8 | 24 | . | -7 | . | 13 | 18 | -14 |
| 14 | -7 | 1 | 8 | -2 | 12 | 29 | 4 | -1 | 8 | 11 | 3 | -8 |
| 15 | -5 | 13 | 8 | 4 | 17 | 22 | -2 | 0 | 6 | 9 | . | -8 |
| 16 | -2 | 16 | 5 | 7 | 20 | 19 | -4 | 0 | 9 | -3 | -9 | -11 |
| 17 | -2 | 8 | 4 | . | 30 | 14 | -3 | 6 | 6 | -12 | -12 | -9 |
| 18 | 0 | 0 | 1 | . | 20 | 5 | . | 3 | 3 | -13 | -13 | 1 |
| 19 | 11 | -6 | 0 | . | 15 | -1 | 0 | 8 | 0 | -20 | -15 | 13 |
| 20 | 13 | . | 4 | 24 | 11 | -9 | . | 6 | -4 | . | -12 | 18 |
| 21 | 6 | -13 | 7 | 33 | 5 | -5 | 11 | 5 | . | . | -7 | 21 |
| 22 | -10 | -7 | 14 | 33 | -3 | -1 | 9 | 1 | -14 | 3 | 2 | 13 |
| 23 | -18 | -4 | 23 | 25 | -12 | 6 | 2 | -10 | -12 | 7 | . | 17 |
| 24 | -16 | 4 | 26 | 19 | -10 | 12 | 5 | -10 | -12 | 12 | 15 | 9 |
| 25 | -19 | 13 | 27 | 18 | -6 | 14 | -5 | -14 | -7 | 13 | 13 | 6 |
| 26 | -18 | 28 | 30 | 16 | . | 20 | 0 | -16 | -6 | 11 | 13 | 9 |
| 27 | -10 | 26 | 24 | 11 | . | 8 | -6 | -16 | 0 | 9 | 10 | 7 |
| 28 | 0 | 27 | 13 | 6 | . | 9 | -5 | -10 | 6 | 5 | 8 | 2 |
| 29 | 6 | 23 | 20 | 6 | . | 9 | -12 | -5 | 8 | | 4 | -10 |
| 30 | 16 | 25 | 15 | 8 | 4 | 4 | -8 | . | 7 | | 7 | -11 |
| 31 | 17 | | 12 | 1 | | -4 | | 11 | 7 | | 6 | |

# MARCH 1977 DATA

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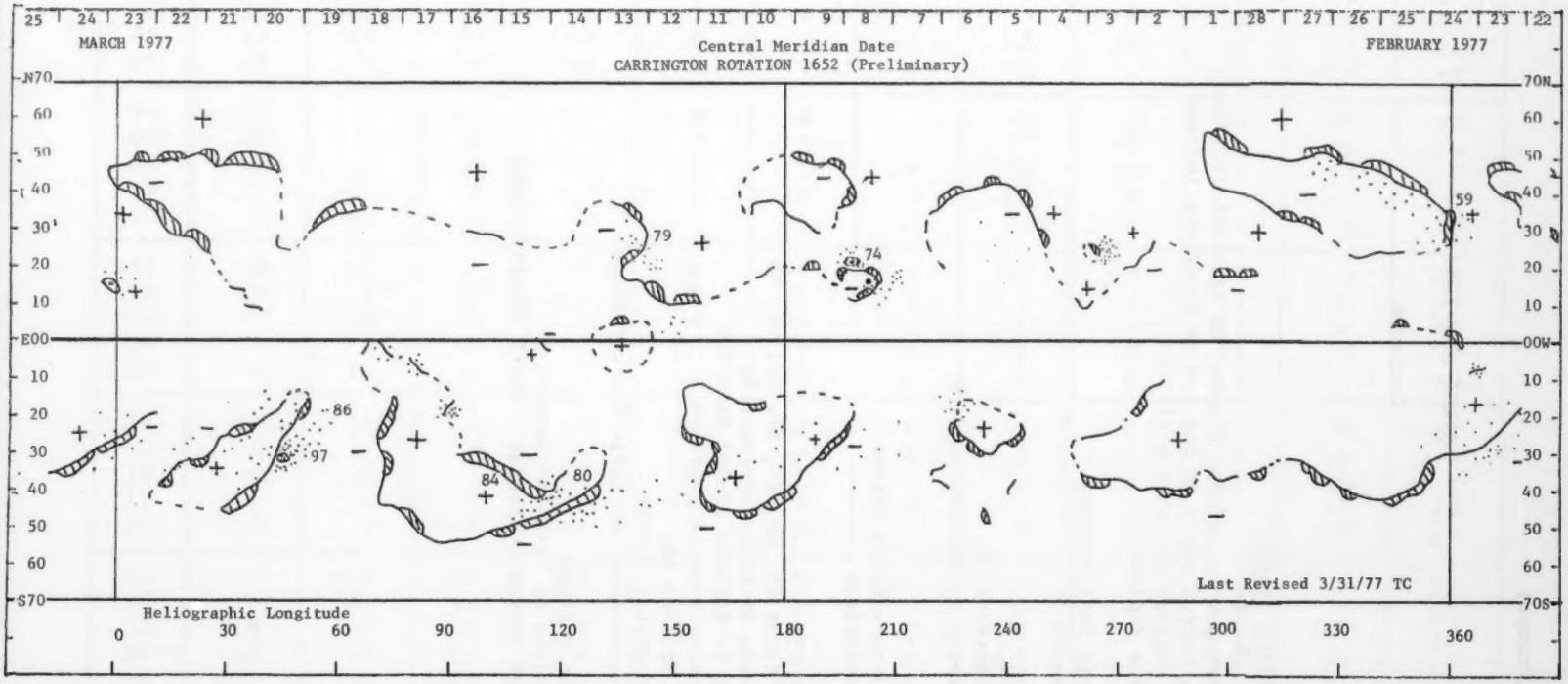
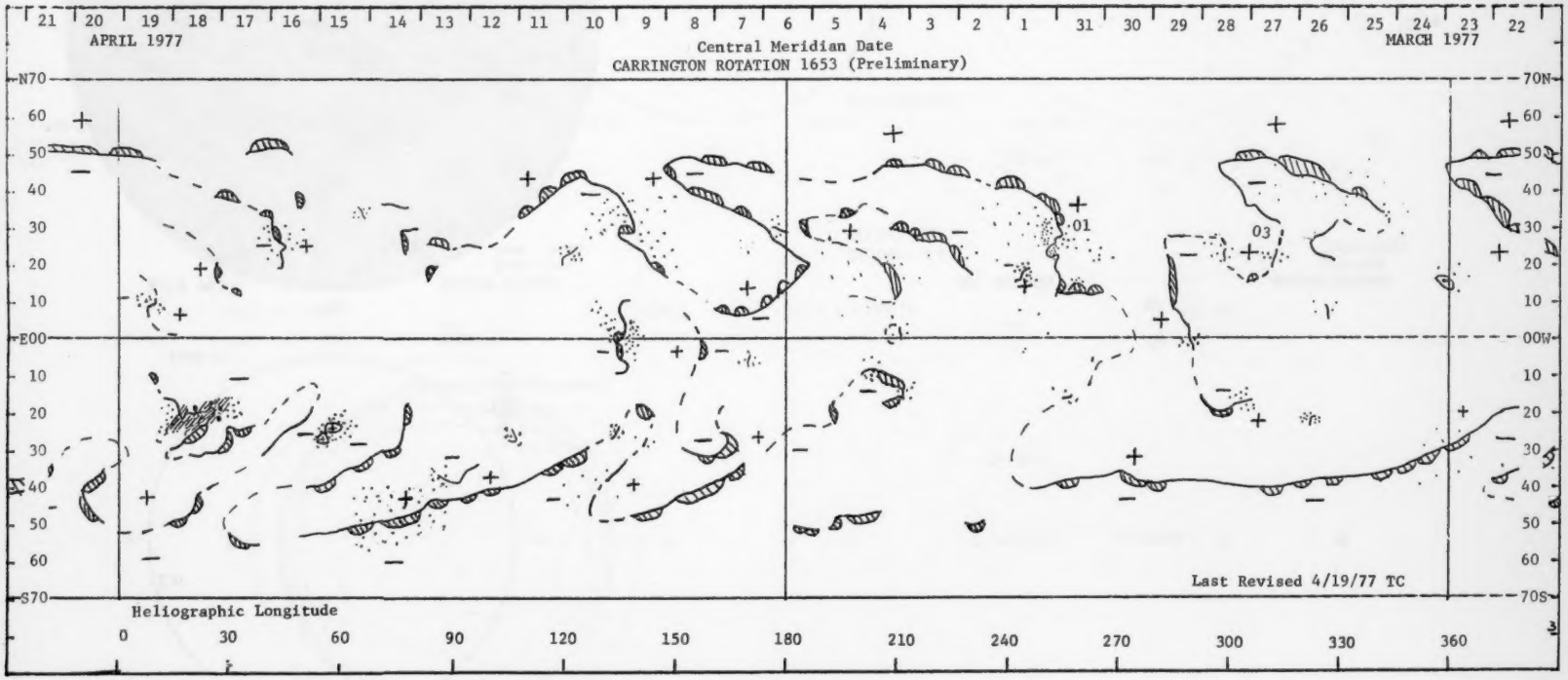
# Hα SYNOPTIC CHART

## CARRINGTON ROTATION 1652 (PRELIMINARY)



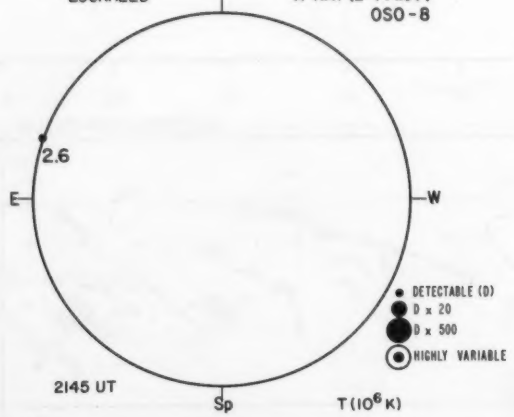
# Hα SYNOPTIC CHART

## CARRINGTON ROTATION 1653 (PRELIMINARY)



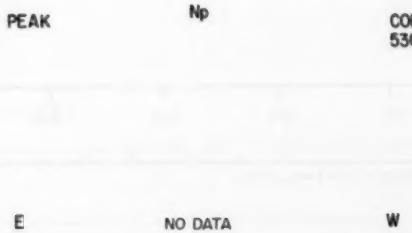
## MARCH 1, 1977 (P = -21.55, $B_o$ = -7.22, $L_o$ = 300.97)

LOCKHEED X-RAY (2-14 keV) OSO-8

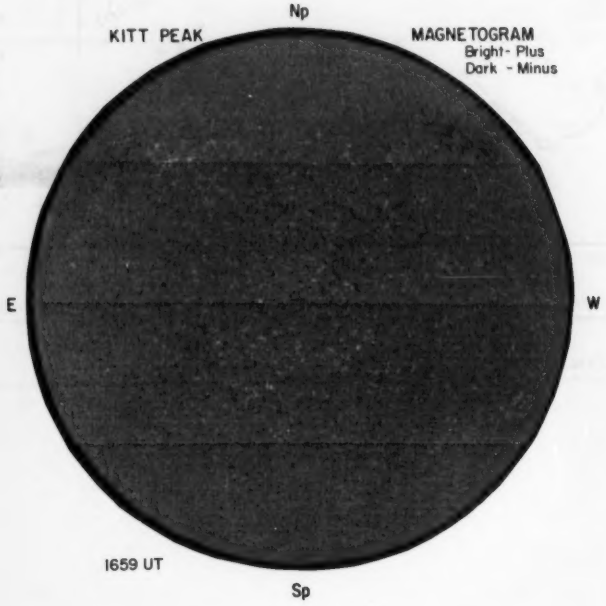



2145 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



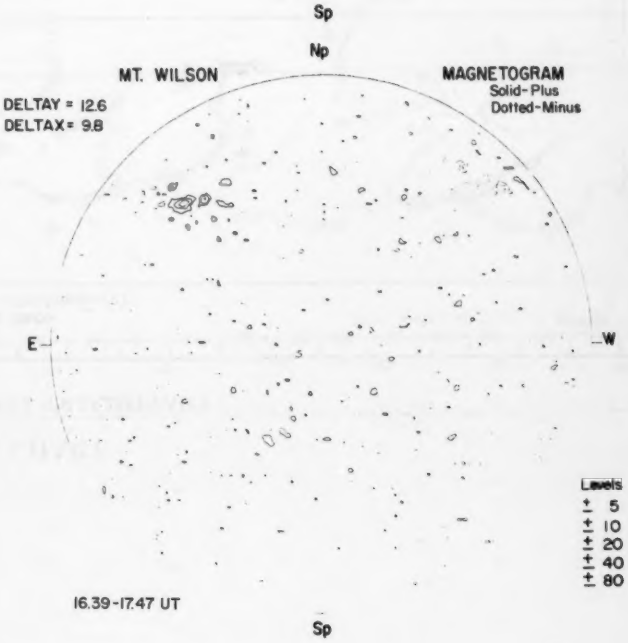

KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1659 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY = 12.6
DELTAX = 9.8

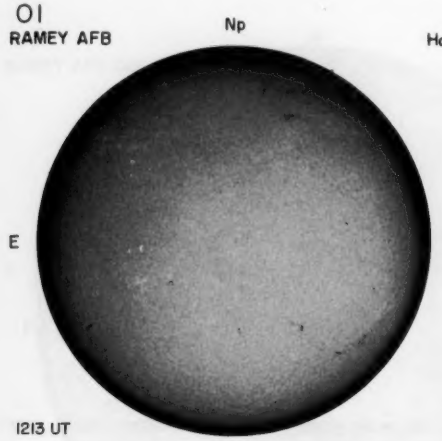



16.39-17.47 UT

Sp

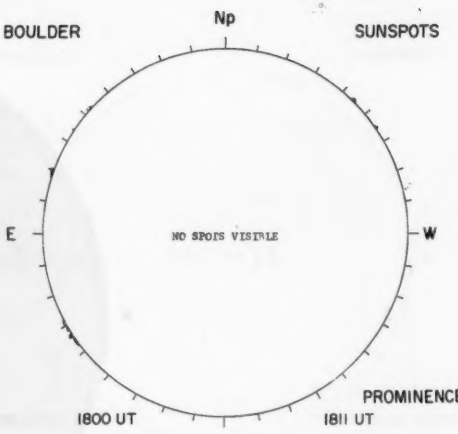
01

RAMEY AFB




1213 UT

Hα BOULDER



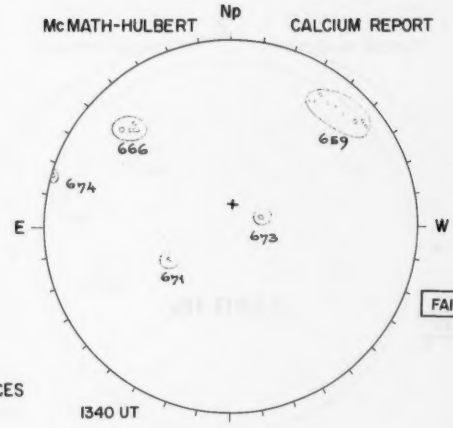

1800 UT

SUNSPOTS

1811 UT

PROMINENCES

McMATH-HULBERT



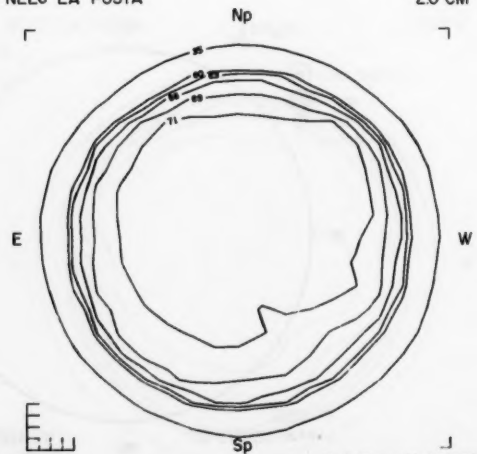

1340 UT

CALCIUM REPORT

FAIR | M

NELC LA POSTA

2.0 CM




1837 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

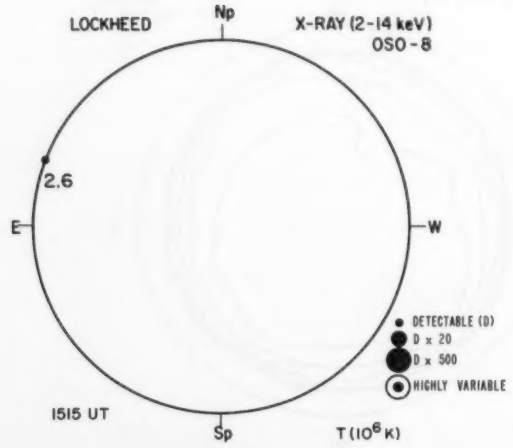
8.6 MM

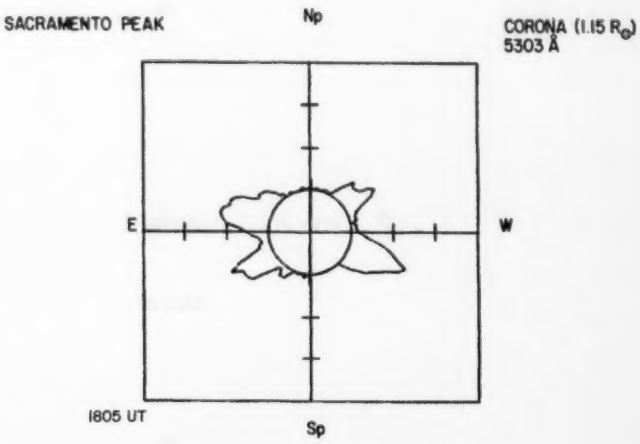
---- UT

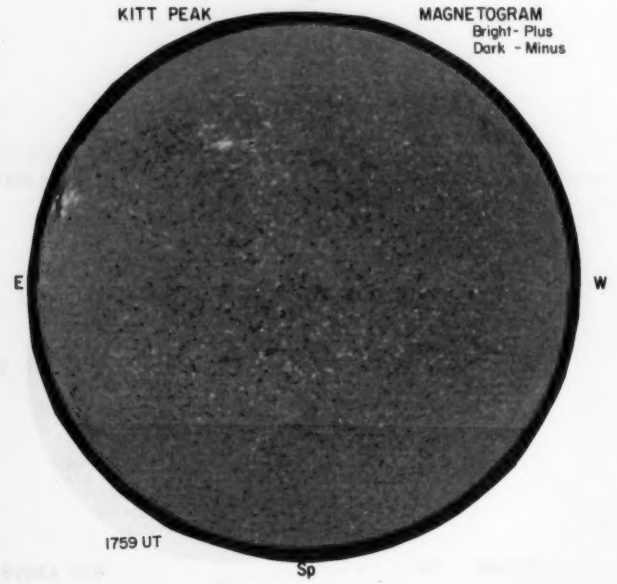
Ant. Temp. Unit 100°K

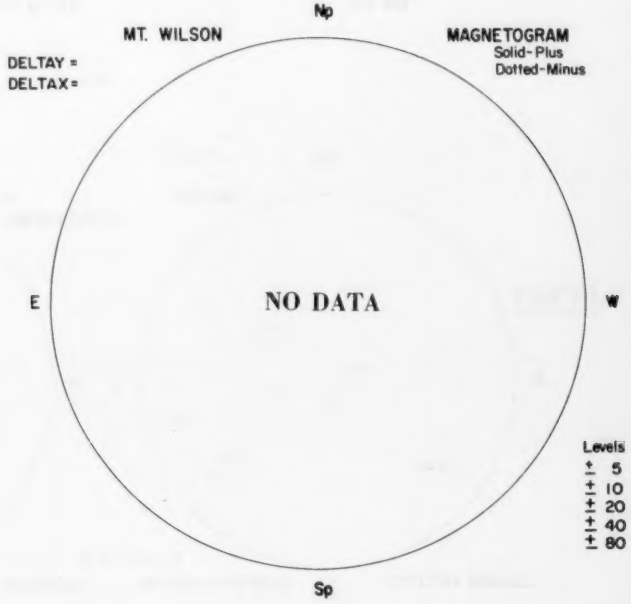
Naval Electronics Laboratory Center (NELC) has changed its name to Naval Ocean Systems Center (NOSC).

## MARCH 2, 1977 (P = -21.80, $B_o$ = -7.23, $L_o$ = 287.80)



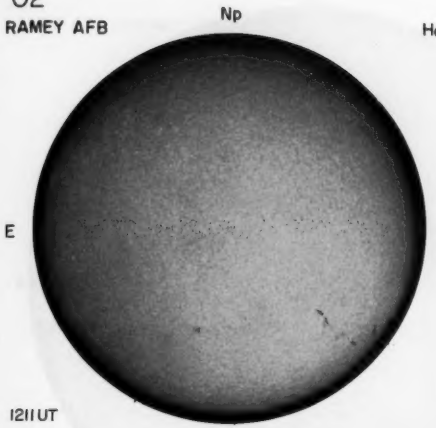



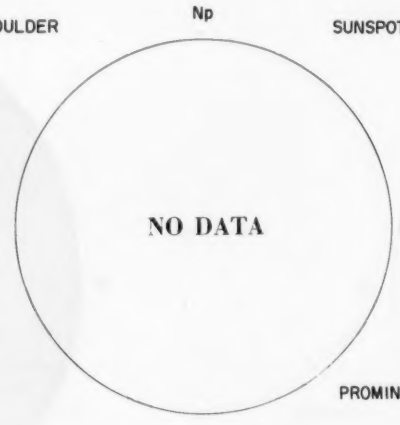
02

RAMEY AFB




1211 UT

Hα BOULDER

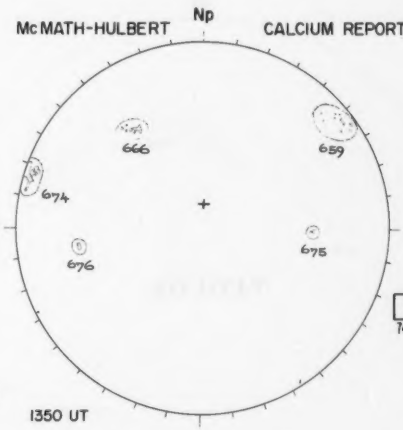



SUNSPOTS

PROMINENCES

McMATH-HULBERT

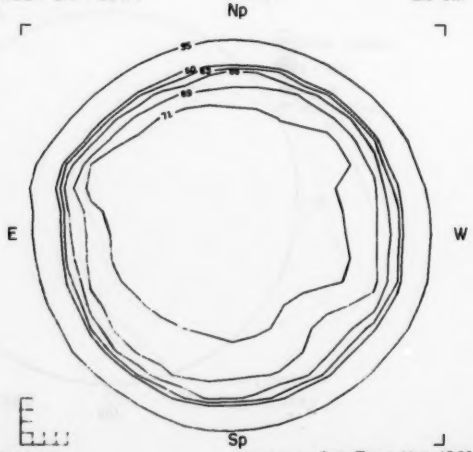
CALCIUM REPORT




GOOD | S
74 - 1200 - 2.5

1350 UT

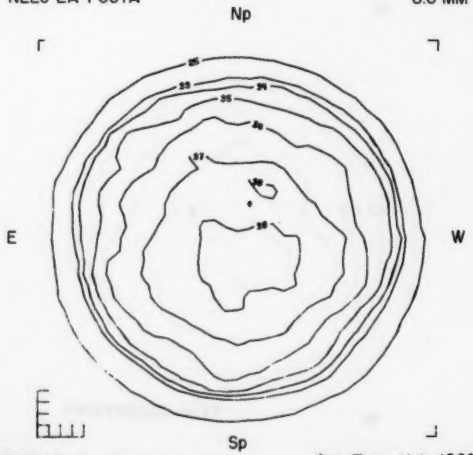
NELC LA POSTA 2.0 CM




1850 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

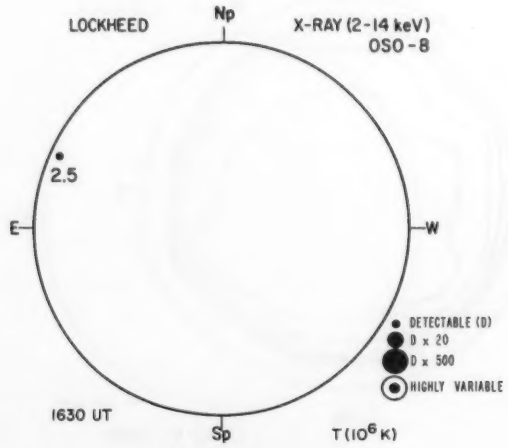



1723 UT

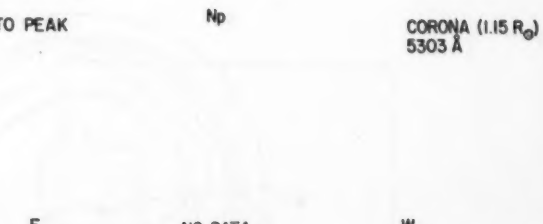
Ant. Temp. Unit 100°K

MARCH 3, 1977 (P =- 22.04, $B_o$ =-7.24, $L_o$ =274.62)

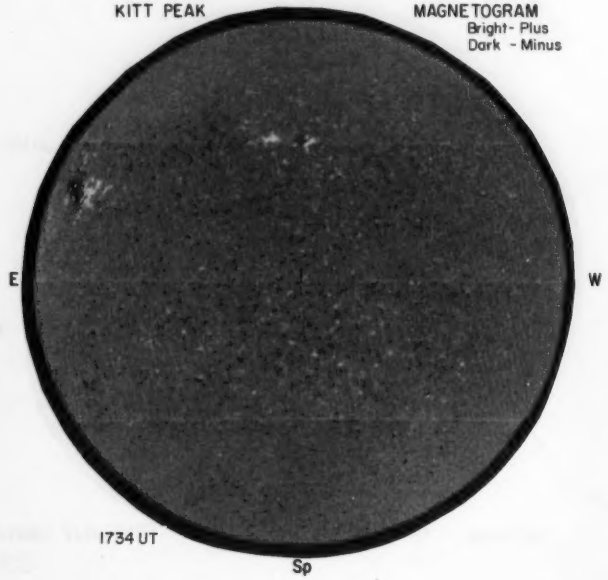
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

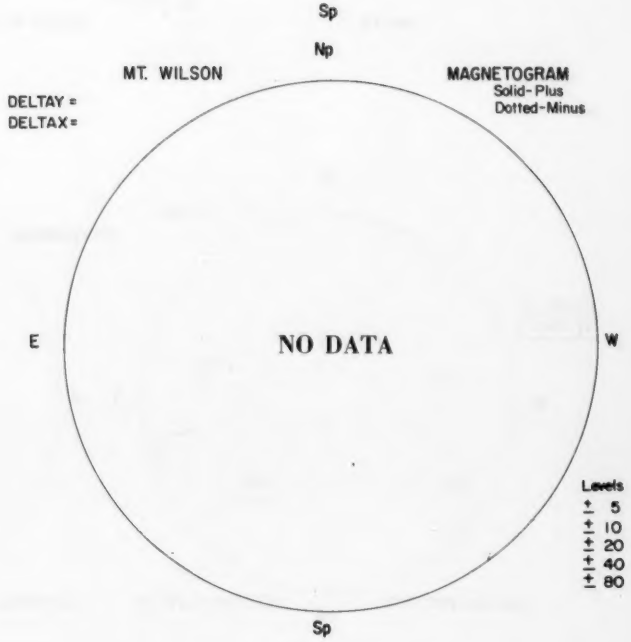



KITT PEAK MAGNETOGRAM Bright- Plus Dark - Minus



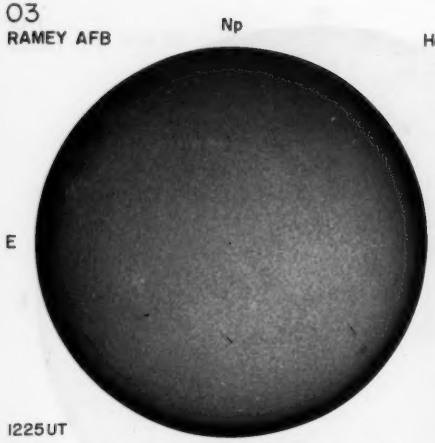

MT. WILSON MAGNETOGRAM Solid- Plus Dotted-Minus

DELTAY =
DELTAX =



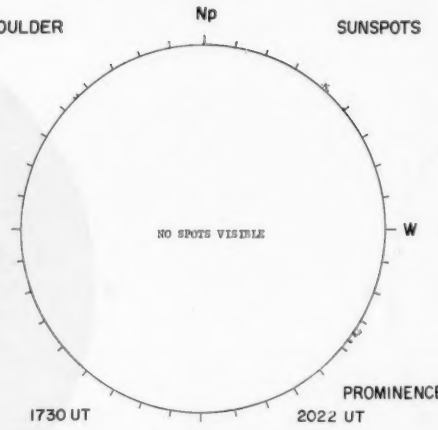
03

RAMEY AFB




1225 UT

Hα BOULDER



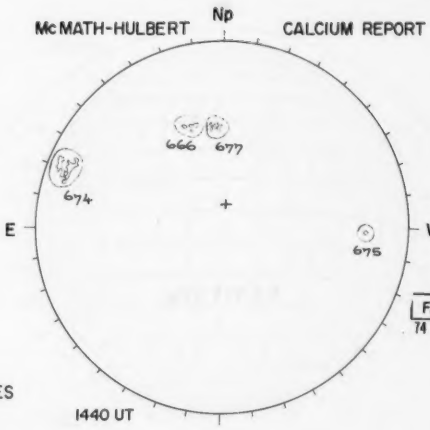

1730 UT

SUNSPOTS

2022 UT

PROMINENCES

McMATH-HULBERT



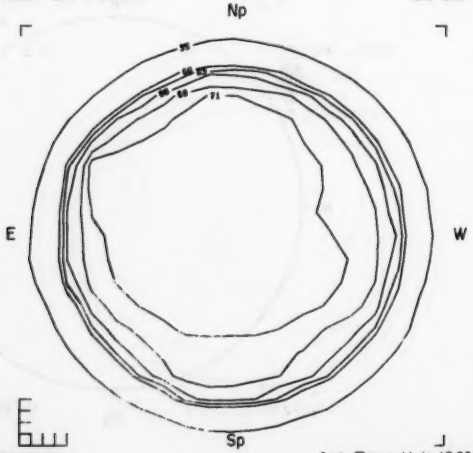

1440 UT

CALCIUM REPORT

FAIR M
74 - 1500-25

NELC LA POSTA

2.0 CM

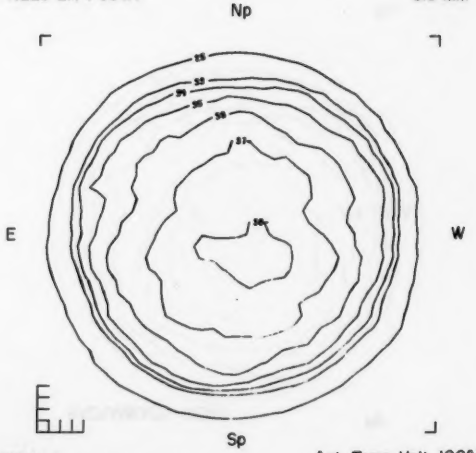



2029 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM



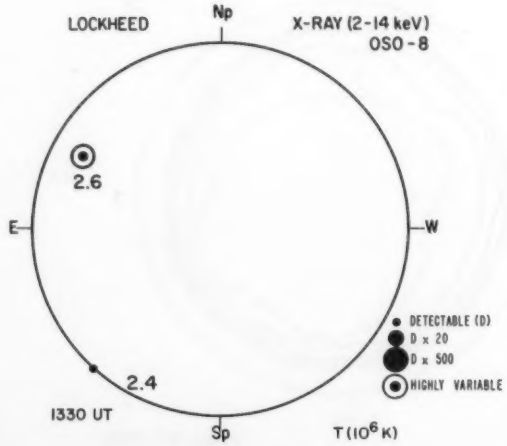

1654 UT

Ant. Temp. Unit 100°K

# MARCH 4, 1977 (P = -22.28, $B_o$ = -7.24, $L_o$ = 261.45)

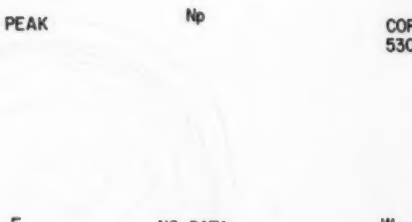
LOCKHEED

X-RAY (2-14 keV)
OSO-8



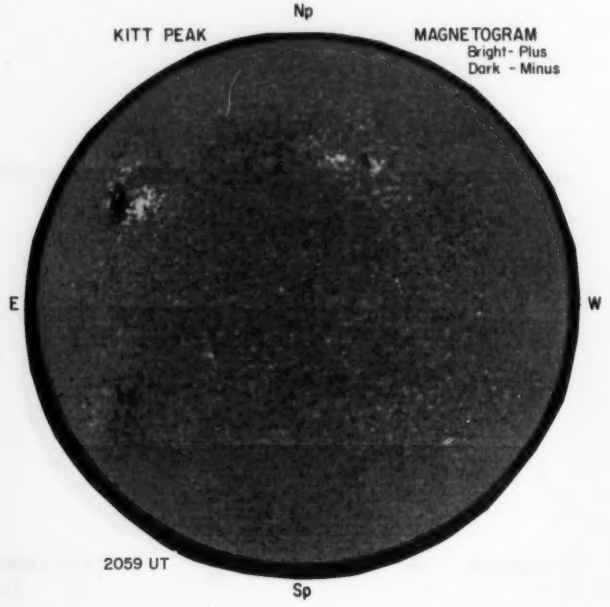

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

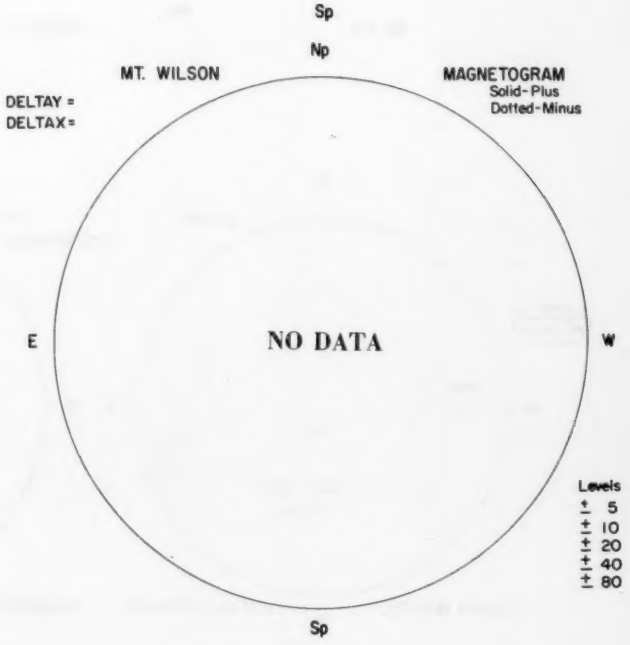
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

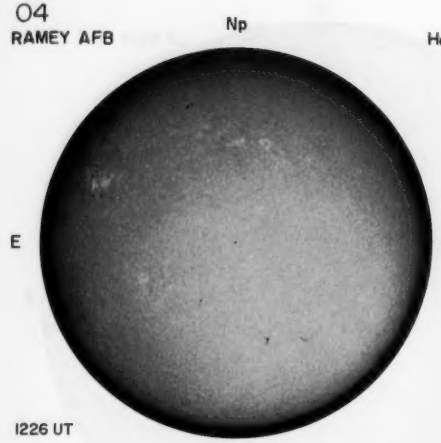
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



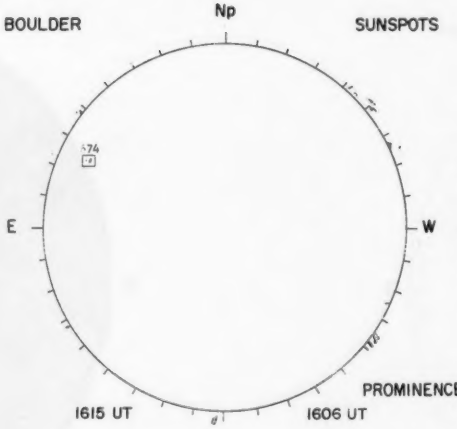
04

RAMEY AFB




BOULDER

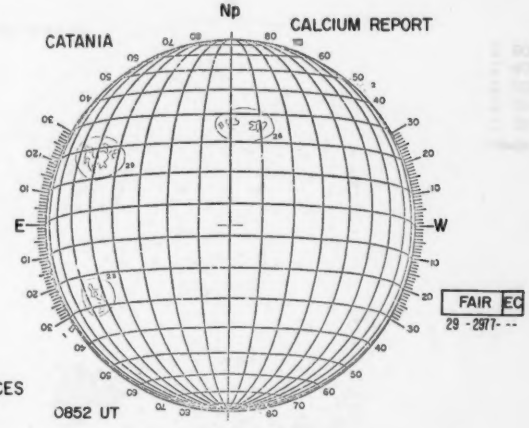
SUNSPOTS




PROMINENCES

CATANIA

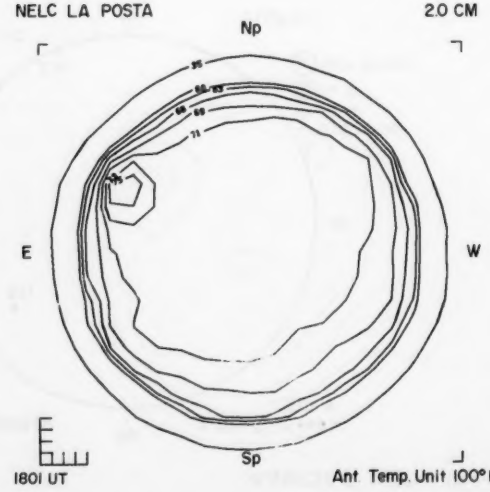
CALCIUM REPORT




FAIR EC
29 -2977- --

NELC LA POSTA

2.0 CM

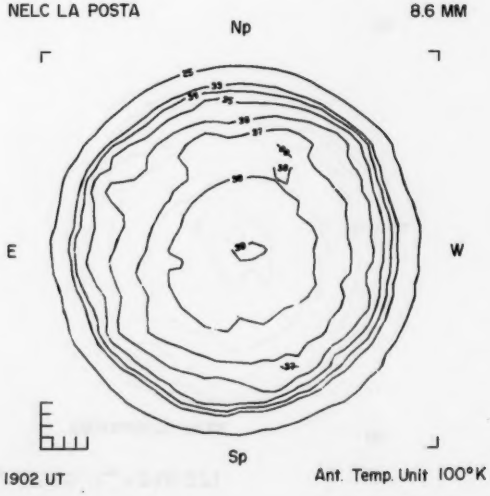



1801 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM



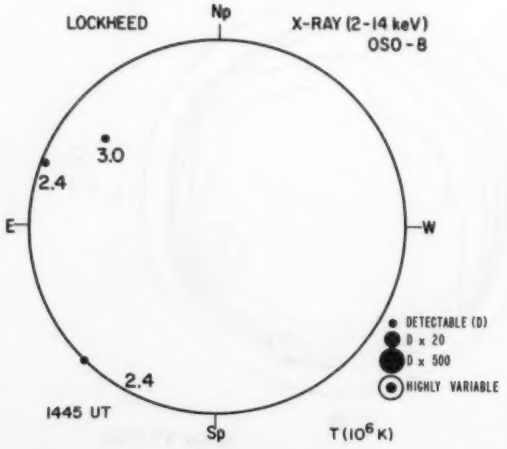

1902 UT

Ant. Temp. Unit 100°K

# MARCH 5, 1977 (P=-22.51, $B_o$=-7.25, $L_o$=248.27)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

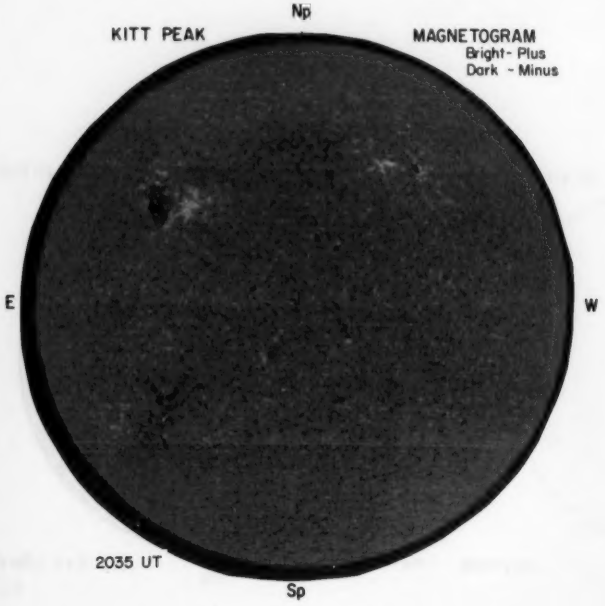



SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

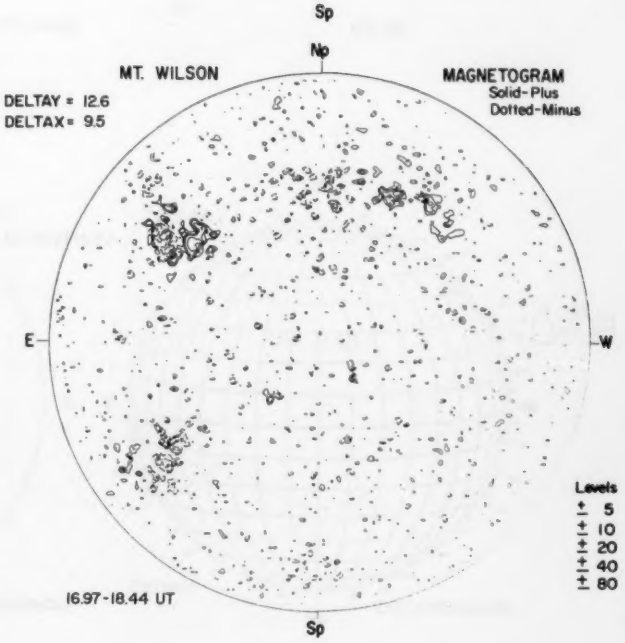
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

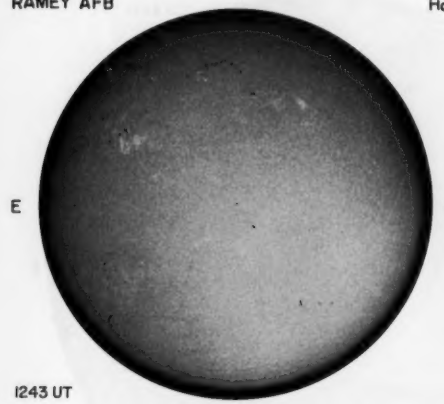
DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



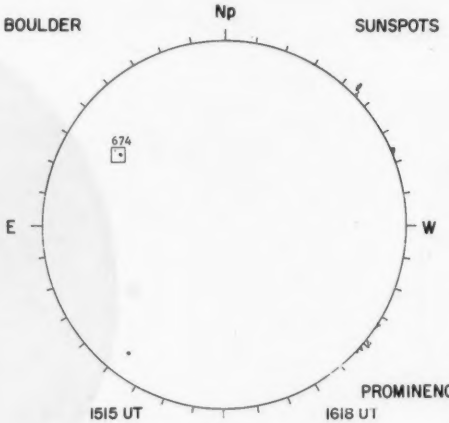
05

RAMEY AFB




1243 UT

Hα BOULDER



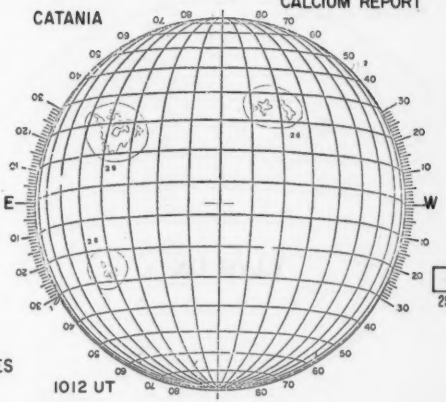

1515 UT

SUNSPOTS

PROMINENCES

1618 UT

CATANIA CALCIUM REPORT

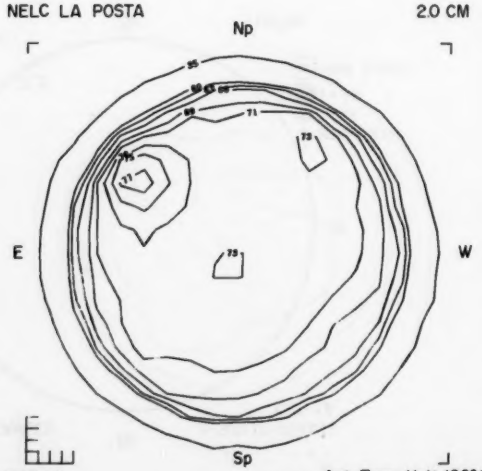



1012 UT

FAIR GD

29-4649- --

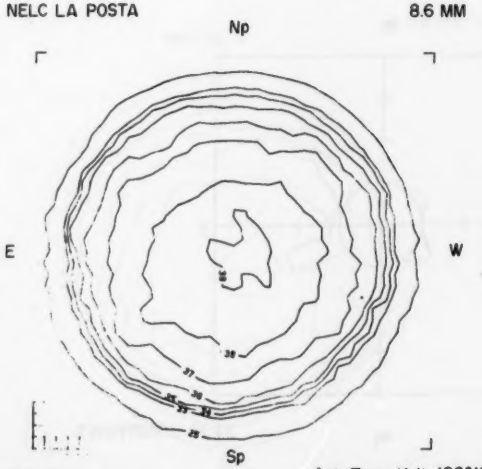
NELC LA POSTA 2.0 CM




1837 UT

Ant. Temp. Unit 100°K

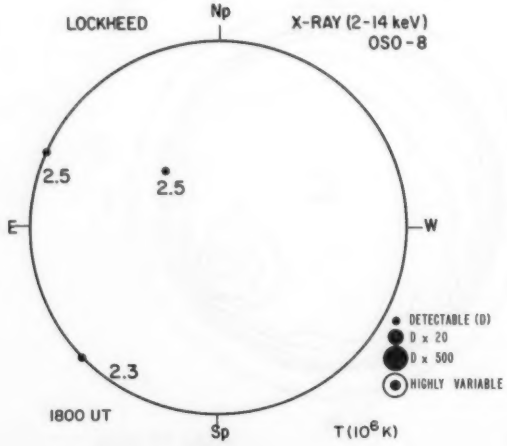
NELC LA POSTA 8.6 MM

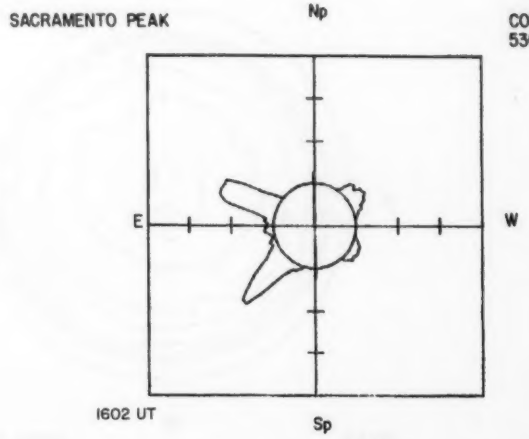


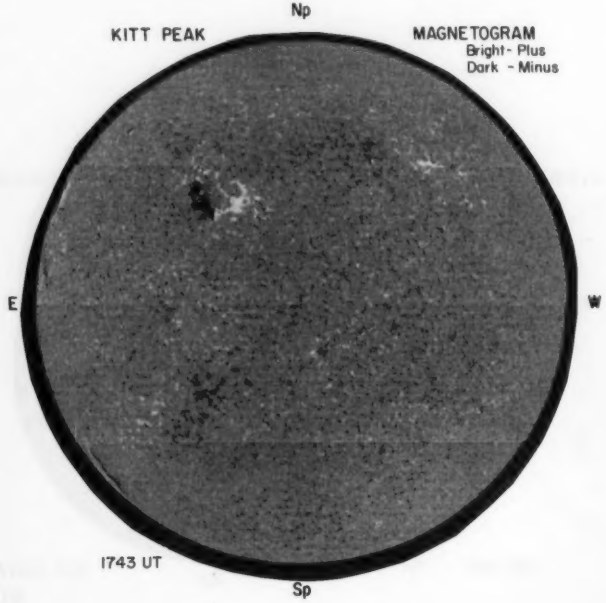

1709 UT

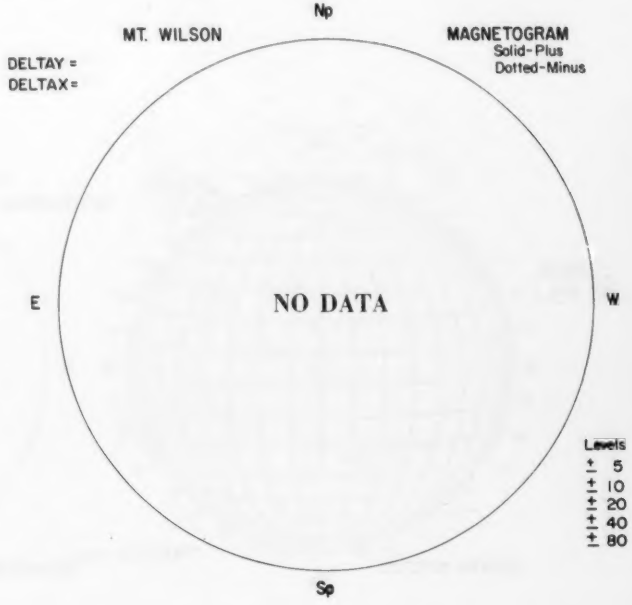
Ant. Temp. Unit 100°K

# MARCH 6, 1977 (P=-22.73, $B_0$=-7.25, $L_0$=235.10)



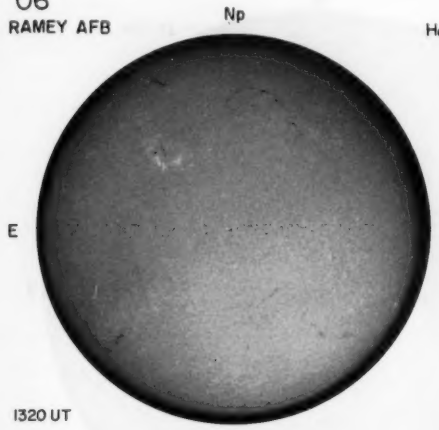



06

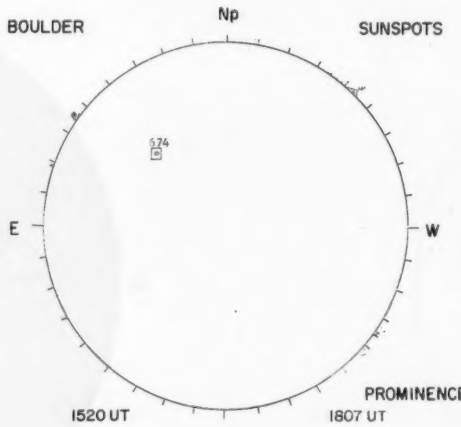
RAMEY AFB




1320 UT

Hα

BOULDER



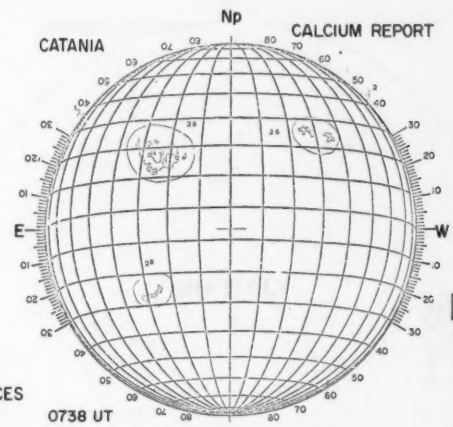

1520 UT

SUNSPOTS

1807 UT

CATANIA

CALCIUM REPORT




0738 UT

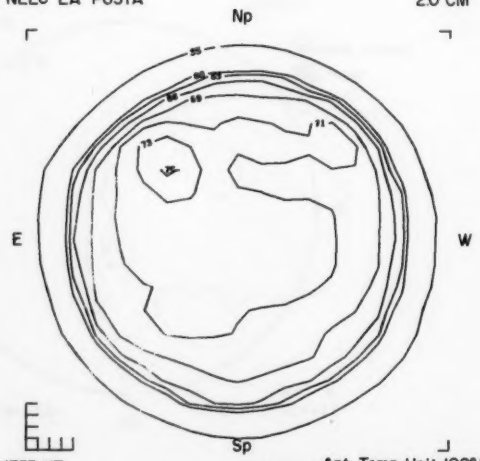
FAIR GD

29 - 2913---

PROMINENCES

NELC LA POSTA

2.0 CM

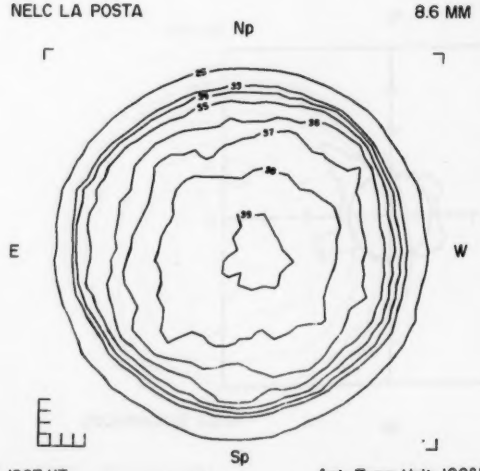



1753 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM

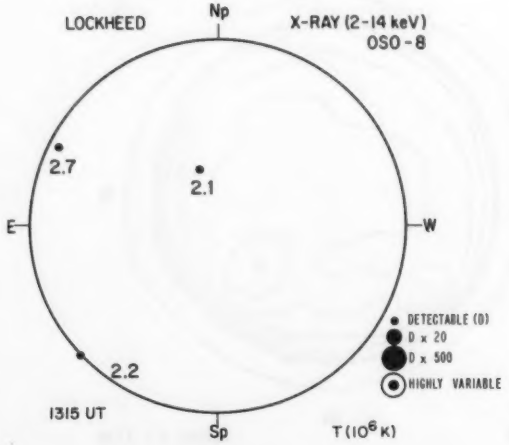



1907 UT

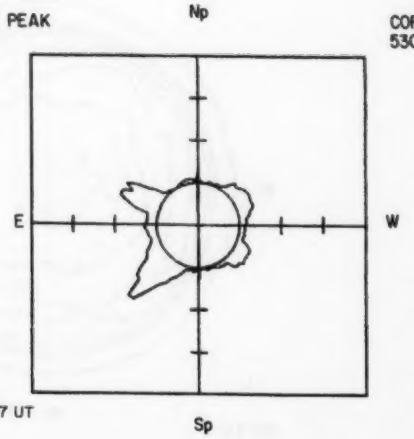
Ant. Temp. Unit 100°K

# MARCH 7, 1977 (P=-22.95, $B_o$=-7.25, $L_o$=221.92)

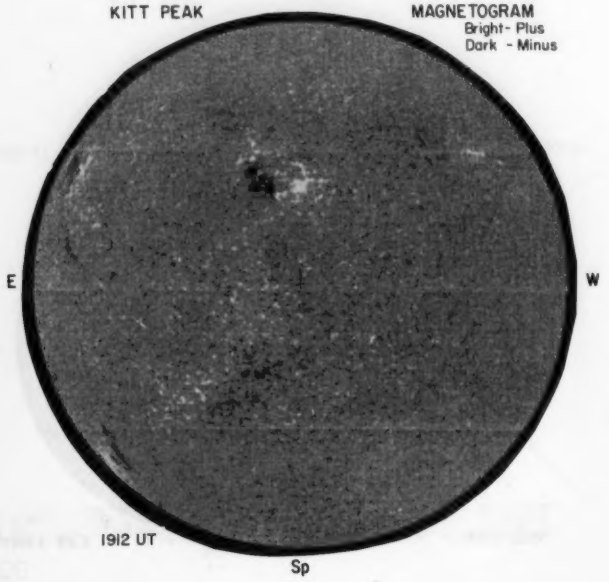
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

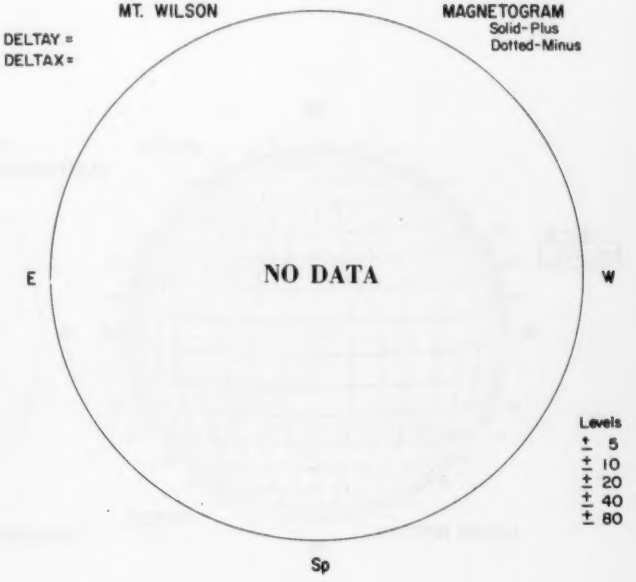



KITT PEAK MAGNETOGRAM Bright- Plus Dark - Minus



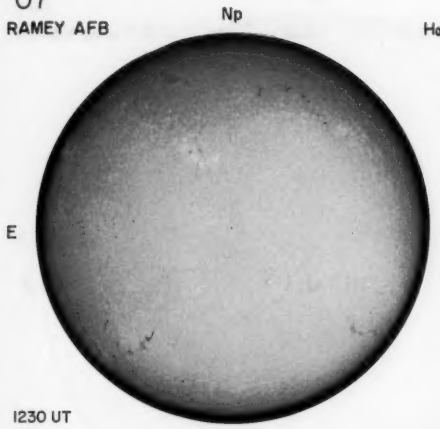

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY =
DELTAX=



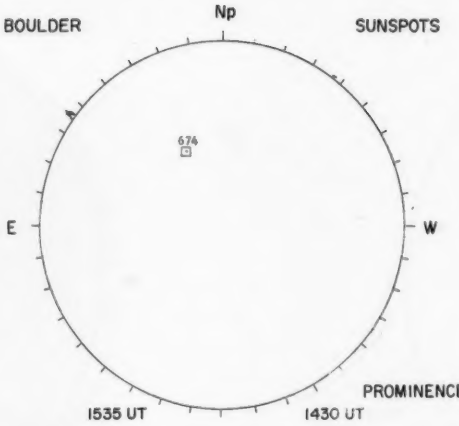
07

RAMEY AFB




1230 UT

Hα BOULDER

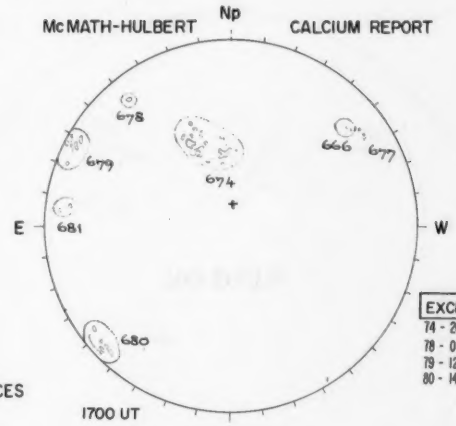



1535 UT

SUNSPOTS

1430 UT

McMATH-HULBERT



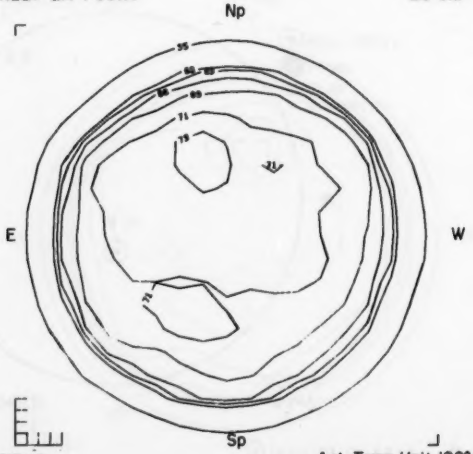

1700 UT

CALCIUM REPORT

| EXCEL | S |
|---|---|
| 74 - 2000 | 3.5 |
| 78 - 0100 | 2.5 |
| 79 - 1200 | 3.0 |
| 80 - 1400 | 2.5 |

PROMINENCES

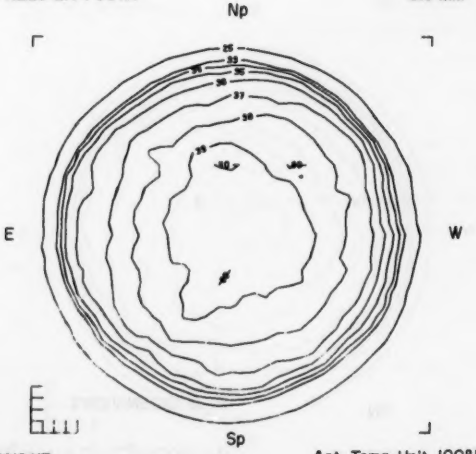
NELC LA POSTA 2.0 CM




1813 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM



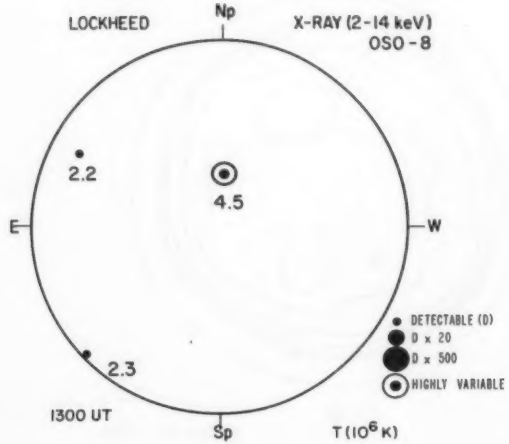

1919 UT

Ant. Temp. Unit 100°K

# MARCH 8, 1977 (P=-23.16, $B_0$=-7.25, $L_0$=208.75)

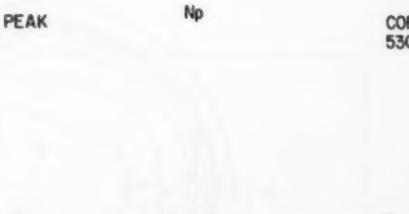
LOCKHEED

X-RAY (2-14 keV)
OSO-8



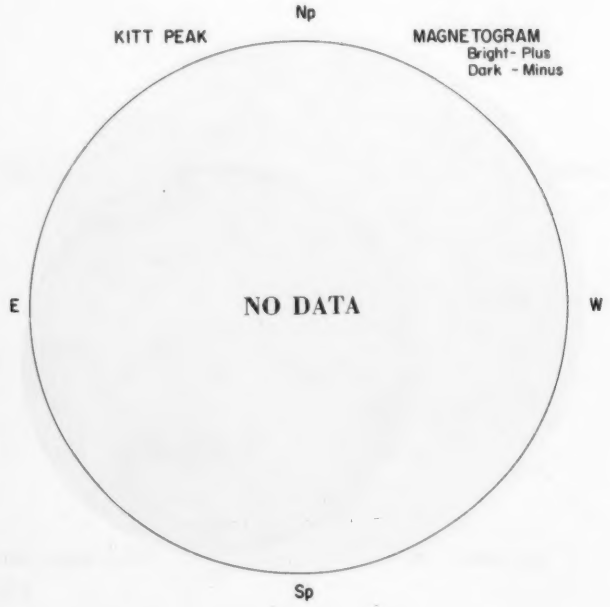

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

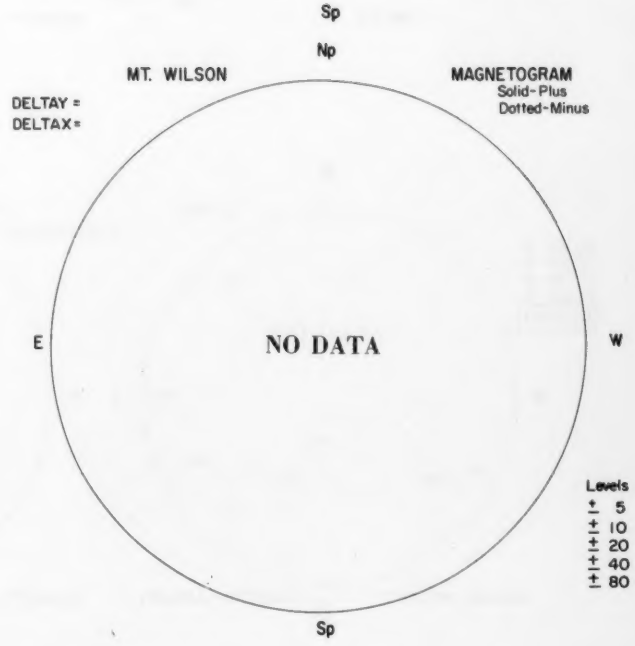
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

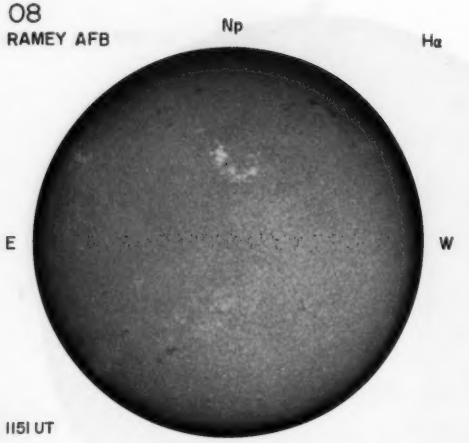
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



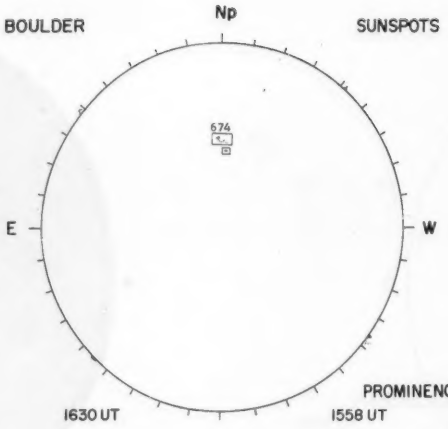
08

RAMEY AFB




1151 UT

Hα BOULDER




1630 UT

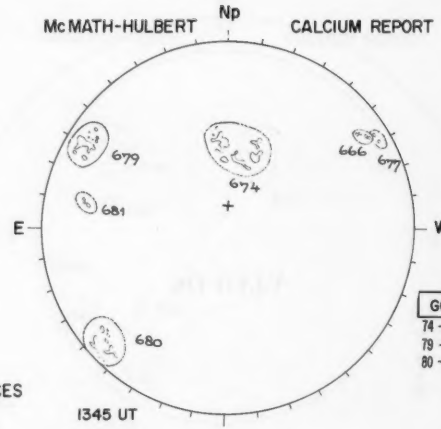
SUNSPOTS

1558 UT

PROMINENCES

McMATH-HULBERT

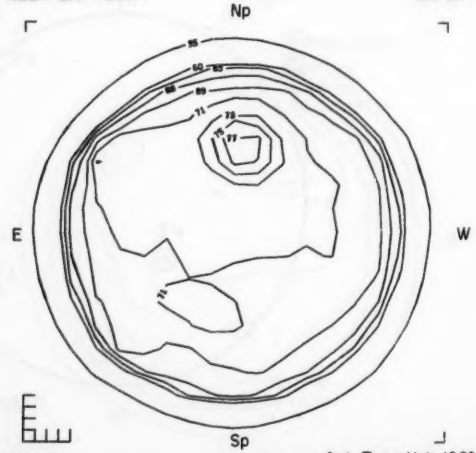
CALCIUM REPORT




1345 UT

| GOOD | D |
|---|---|
| 74 - 2500 | 35 |
| 79 - 2000 | 30 |
| 80 - 1800 | 30 |

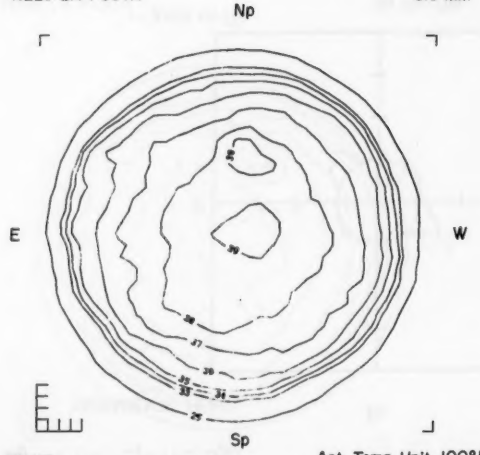
NELC LA POSTA 2.0 CM




1817 UT

Ant. Temp. Unit 100°K

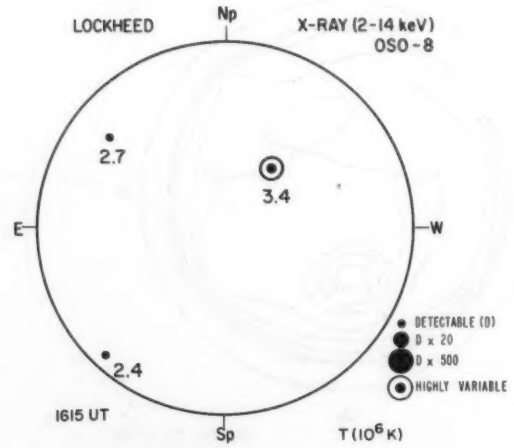
NELC LA POSTA 8.6 MM

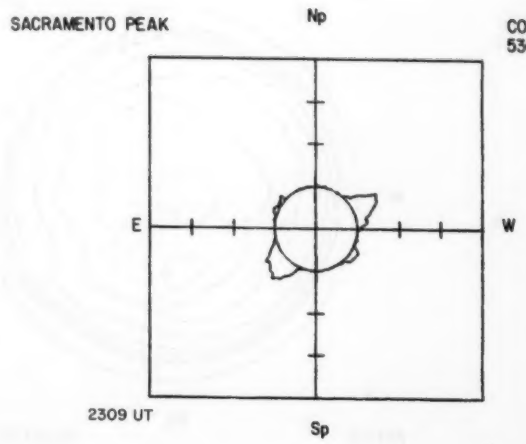


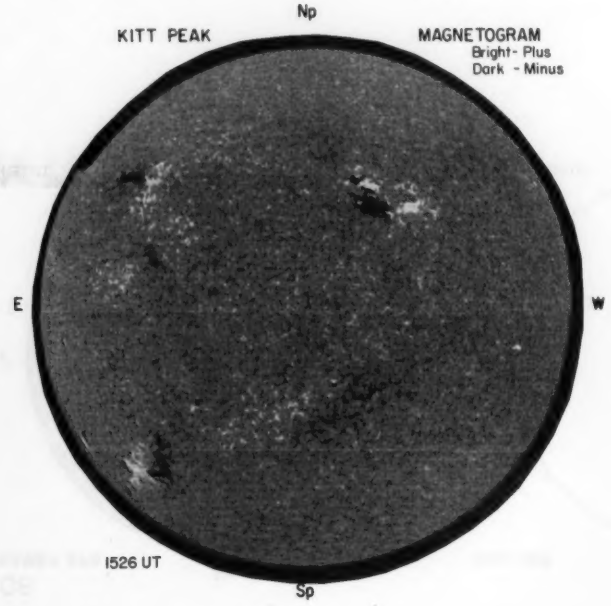

1911 UT

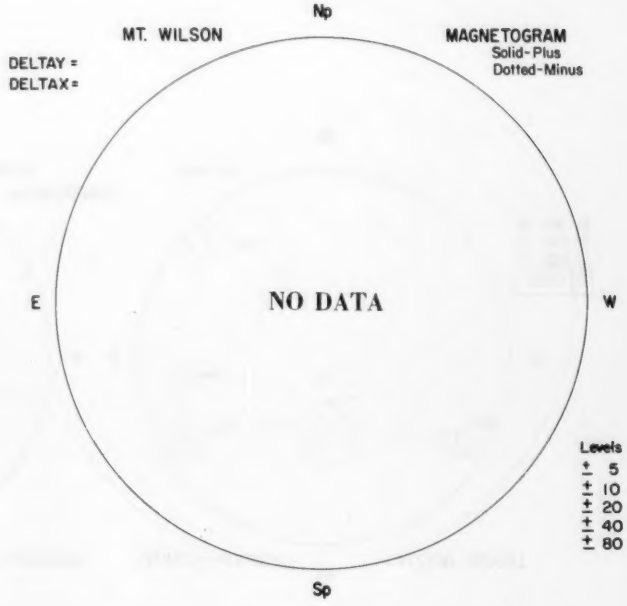
Ant. Temp. Unit 100°K

# MARCH 9, 1977 (P = -23.37, $B_o$ = -7.24, $L_o$ = 195.57)



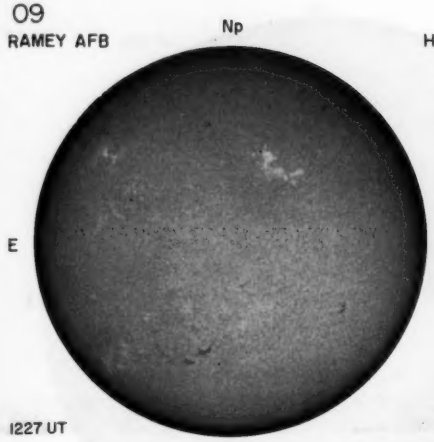



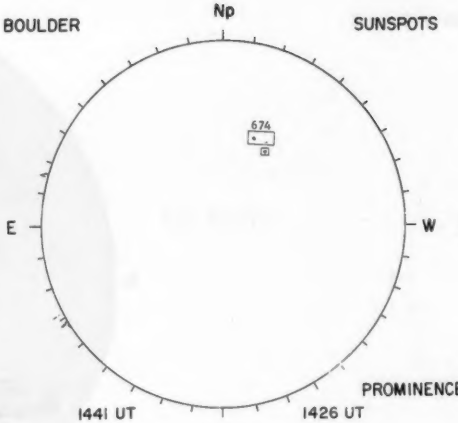
09

RAMEY AFB




1227 UT

Hα BOULDER

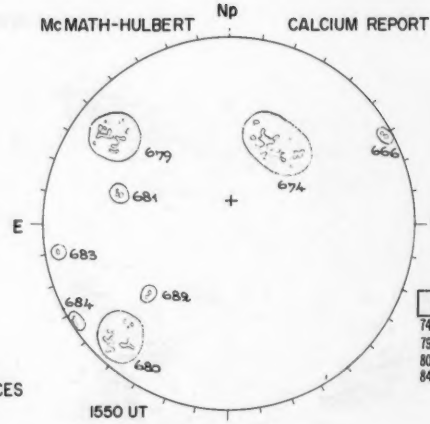



1441 UT 1426 UT

SUNSPOTS

PROMINENCES

McMATH-HULBERT

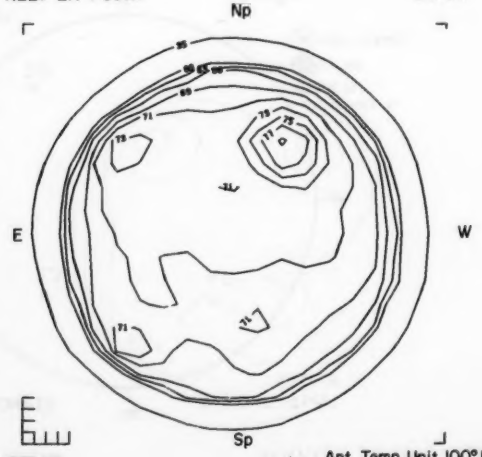



1550 UT

CALCIUM REPORT

| GOOD | S |
|---|---|
| 74 - 2500 | 3.5 |
| 79 - 2000 | 3.0 |
| 80 - 1800 | 3.0 |
| 84 - 0600 | 3.5 |

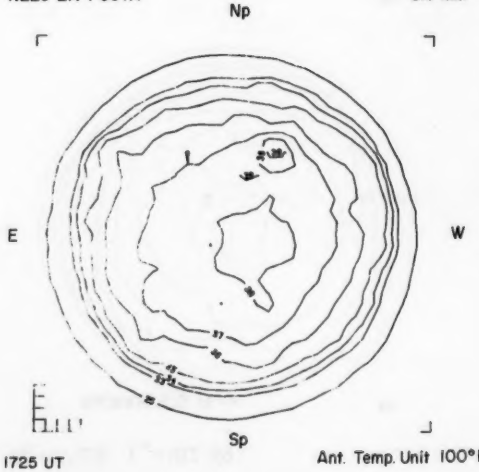
NELC LA POSTA 2.0 CM




1853 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

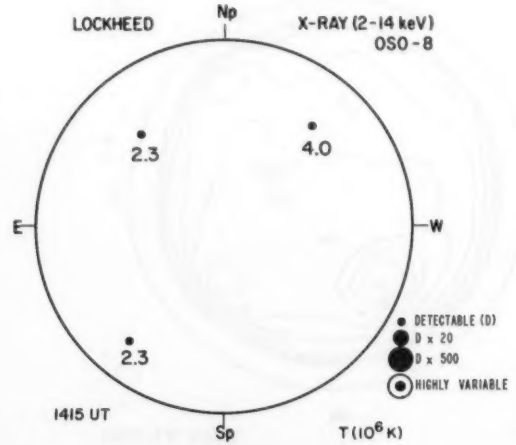



1725 UT

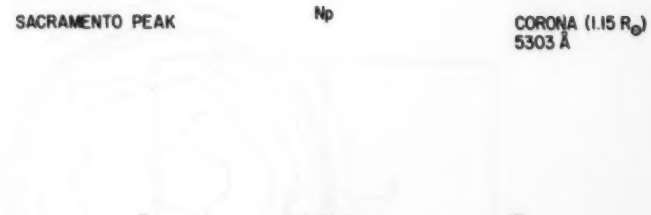
Ant. Temp. Unit 100°K

# MARCH 10, 1977 (P =-23.57, $B_0$ =-7.23, $L_0$ = 182.39)

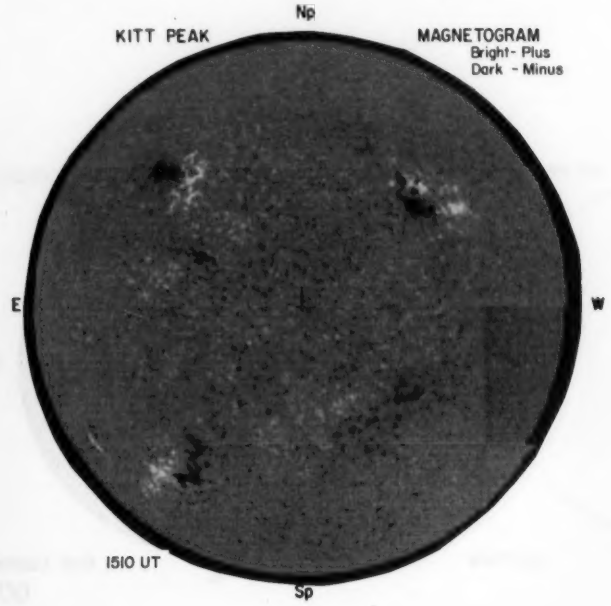
LOCKHEED



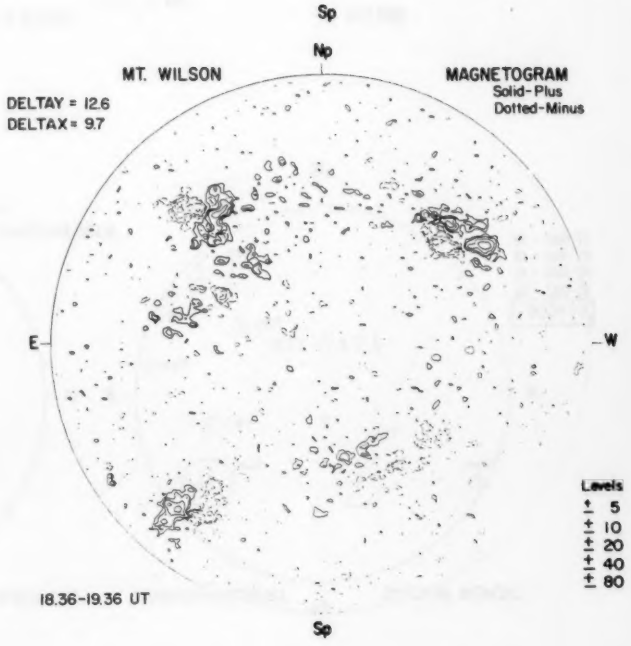

SACRAMENTO PEAK




KITT PEAK



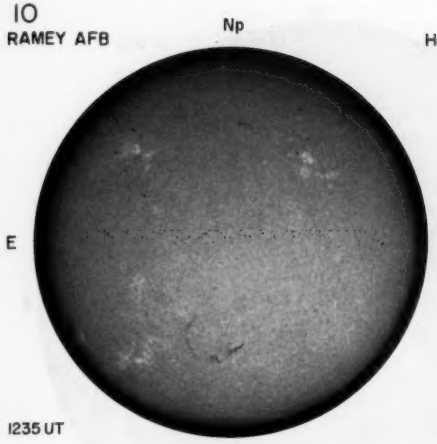

MT. WILSON



Sp

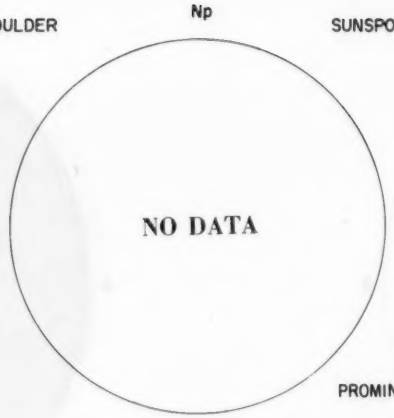
10

RAMEY AFB




1235 UT

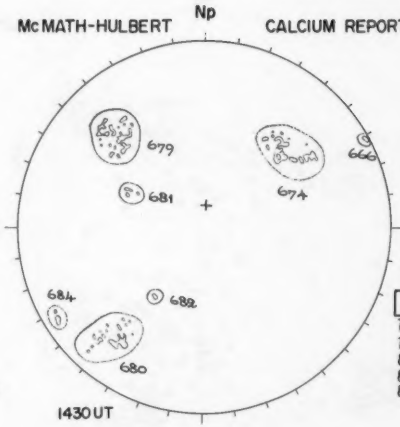
Hα BOULDER




SUNSPOTS

PROMINENCES

McMATH-HULBERT

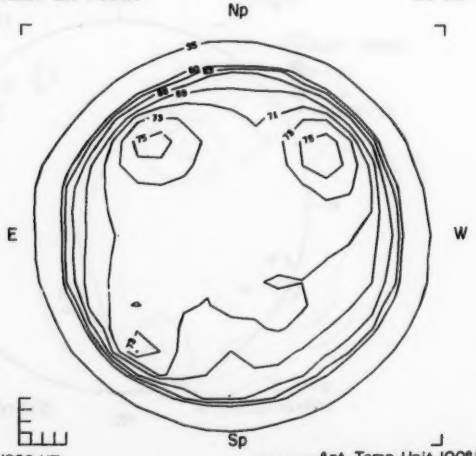



1430 UT

CALCIUM REPORT

| EXCEL | S |
|---|---|
| 74 - | 2500-3.5 |
| 79 - | 2000-3.0 |
| 80 - | 2000-3.0 |
| 82 - | 0100-2.5 |
| 84 - | 0600-3.5 |

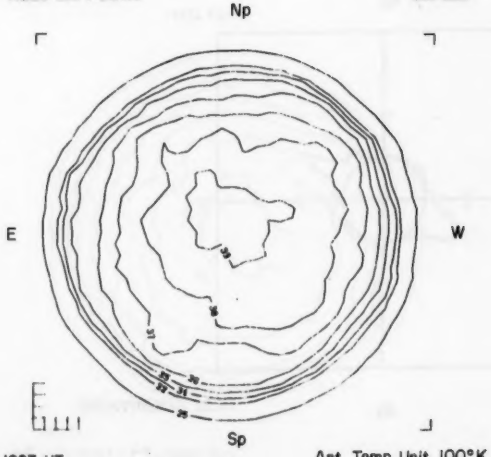
NELC LA POSTA 2.0 CM




1809 UT

Ant. Temp. Unit 100°K

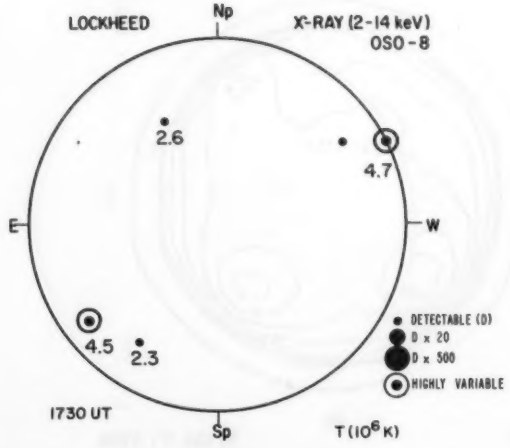
NELC LA POSTA 8.6 MM

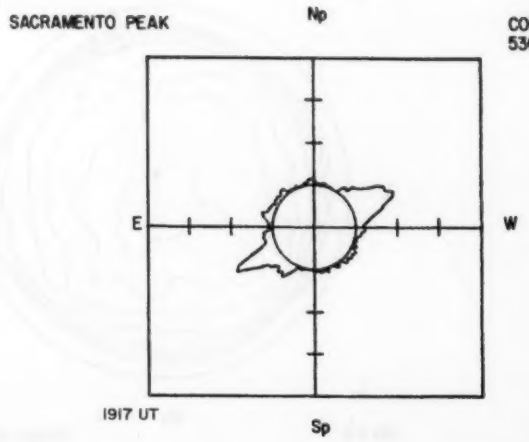


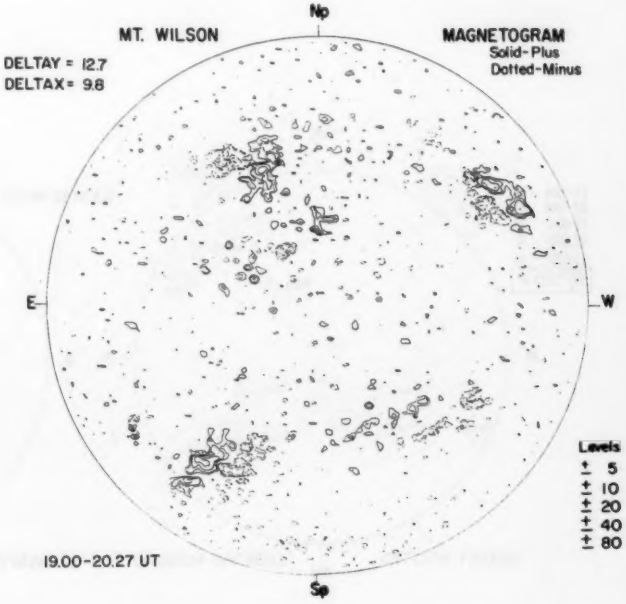

1927 UT

Ant. Temp. Unit 100°K

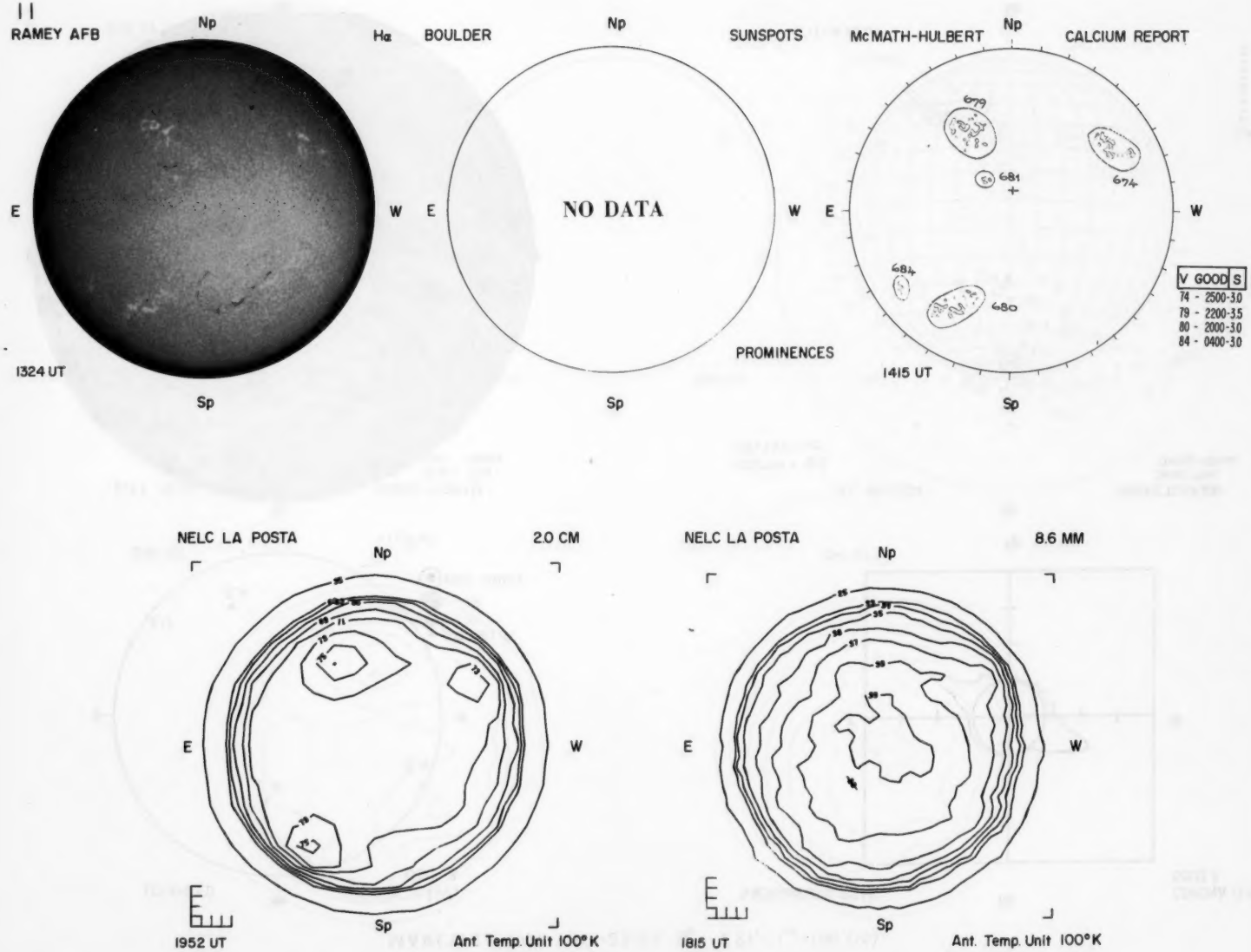
# MARCH 11, 1977 (P=-23.76, $B_o$=-7.22, $L_o$=169.21)



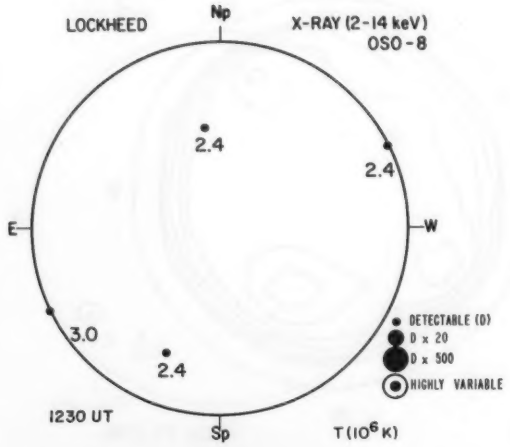


11

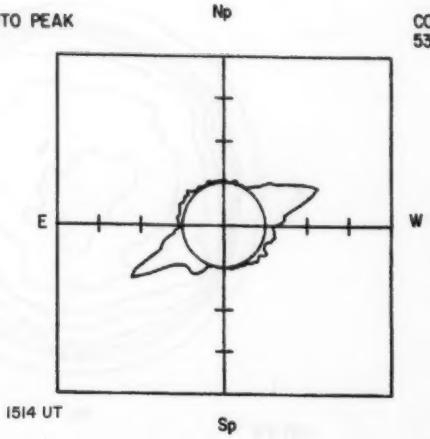

RAMEY AFB
Np
Hα
E
W
Sp
1324 UT
BOULDER
Np
SUNSPOTS
E
NO DATA
W
PROMINENCES
Sp
McMATH-HULBERT
Np
CALCIUM REPORT
679
681
674
684
680
E
W
Sp
1415 UT
V GOOD S
74 - 2500-3.0
79 - 2200-3.5
80 - 2000-3.0
84 - 0400-3.0
NELC LA POSTA
2.0 CM
Np
E
W
Sp
1952 UT
Ant. Temp. Unit 100°K
NELC LA POSTA
8.6 MM
Np
E
W
Sp
1815 UT
Ant. Temp. Unit 100°K

# MARCH 12, 1977 (P=-23.94, $B_0$=-7.21, $L_0$=156.04)

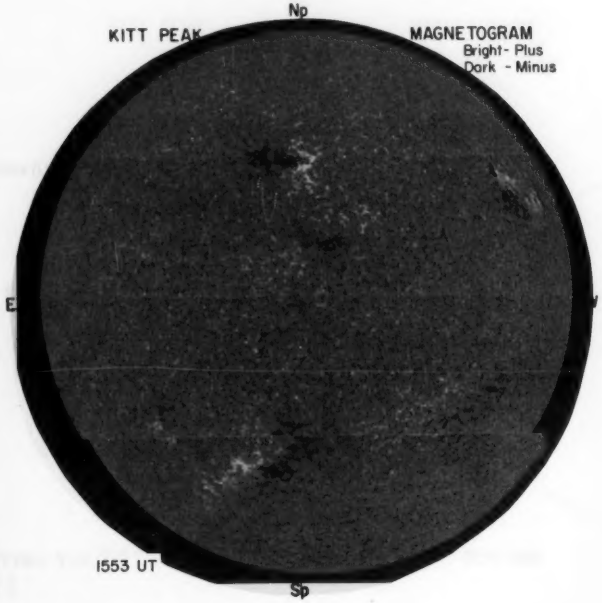
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

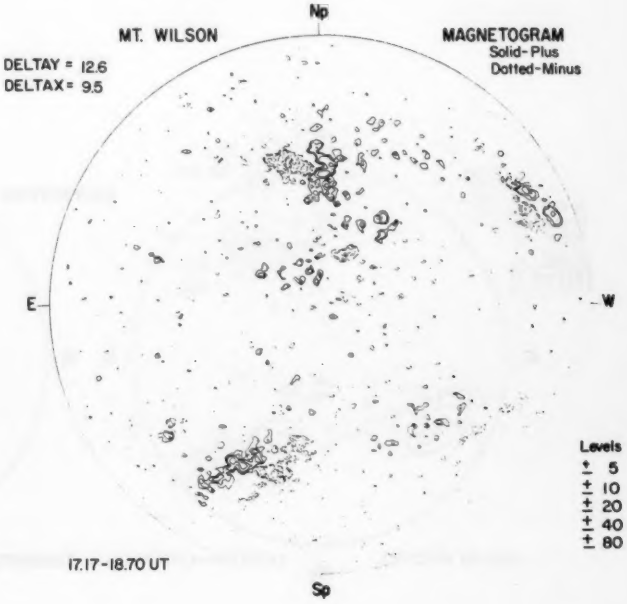



KITT PEAK MAGNETOGRAM Bright- Plus Dark - Minus



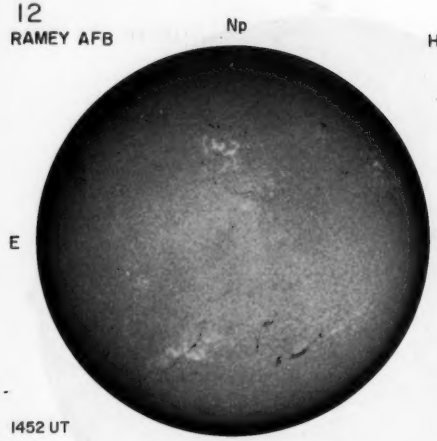

MT. WILSON MAGNETOGRAM Solid- Plus Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5



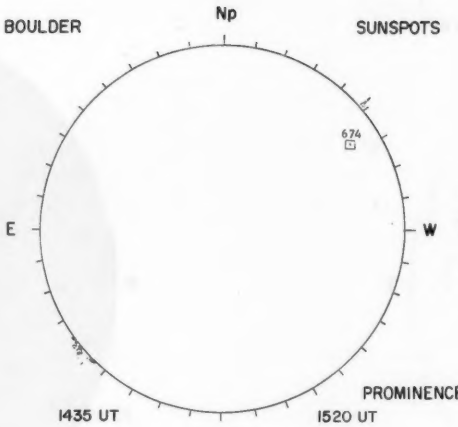
12

RAMEY AFB




1452 UT

Hα BOULDER




1435 UT

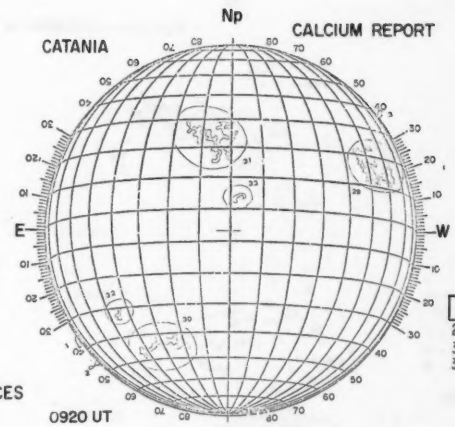
SUNSPOTS




PROMINENCES

1520 UT

CATANIA




0920 UT

CALCIUM REPORT

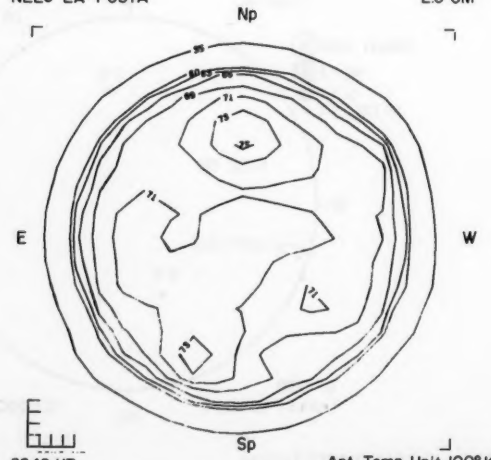
FAIR EC

29 - 3905 - - -

31 - 2862 - - -

30 - 1810 - - -

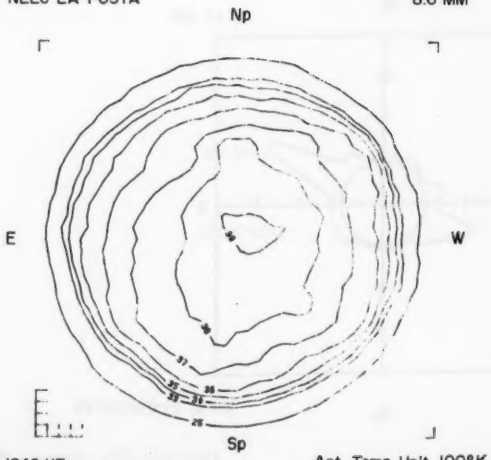
NELC LA POSTA 2.0 CM




2042 UT

Ant. Temp. Unit 100°K

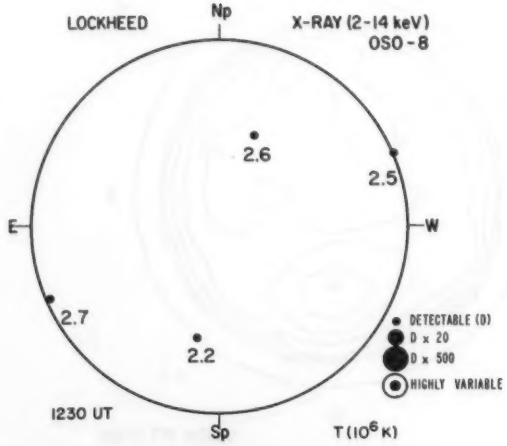
NELC LA POSTA 8.6 MM

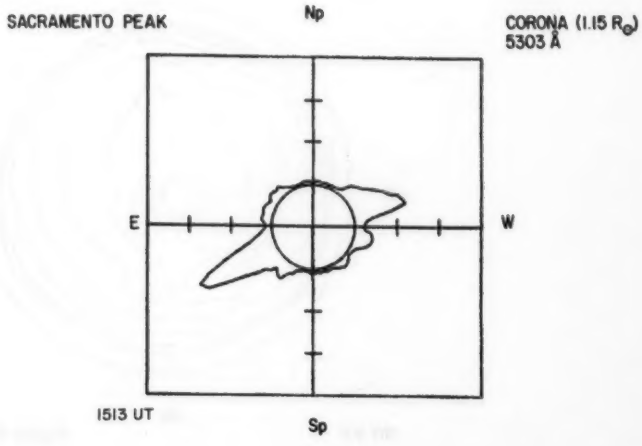


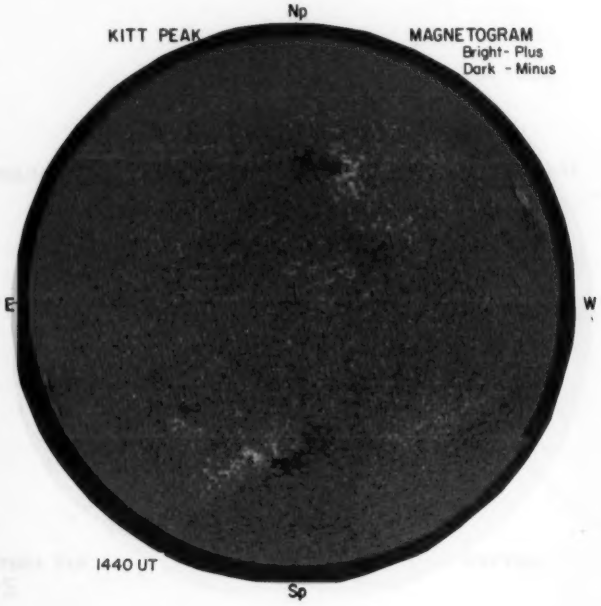

1848 UT

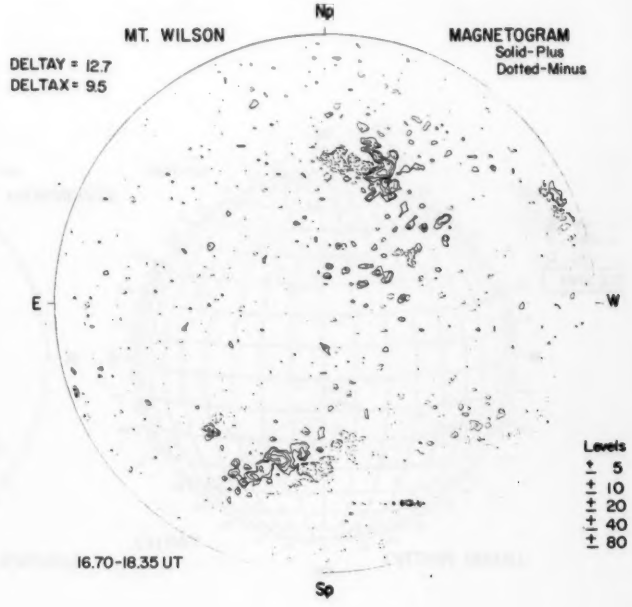
Ant. Temp. Unit 100°K

# MARCH 13, 1977 (P=-24.12, $B_o$=-7.20, $L_o$=142.86)



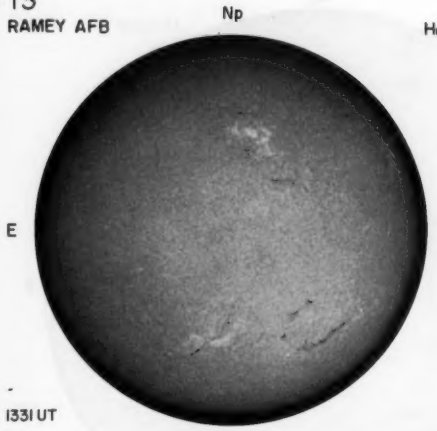



13

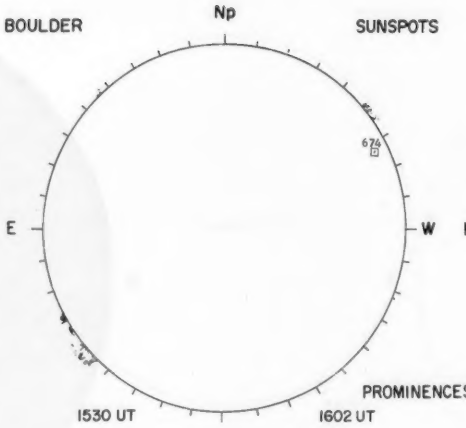
RAMEY AFB




1331 UT

Hα

BOULDER




SUNSPOTS

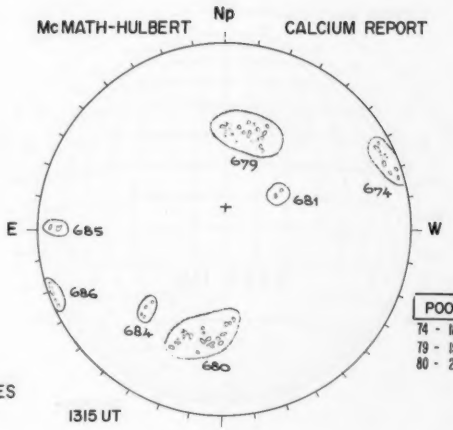
PROMINENCES

1530 UT

1602 UT

McMATH-HULBERT

CALCIUM REPORT

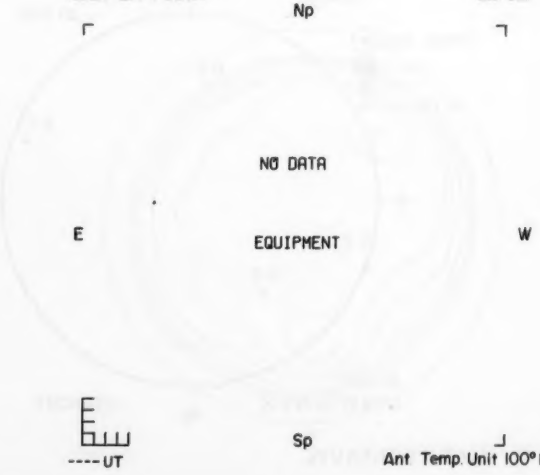



| POOR | S |
|---|---|
| 74 - 1800-25 | |
| 79 - 1900-30 | |
| 80 - 2000-30 | |

1315 UT

NELC LA POSTA

2.0 CM

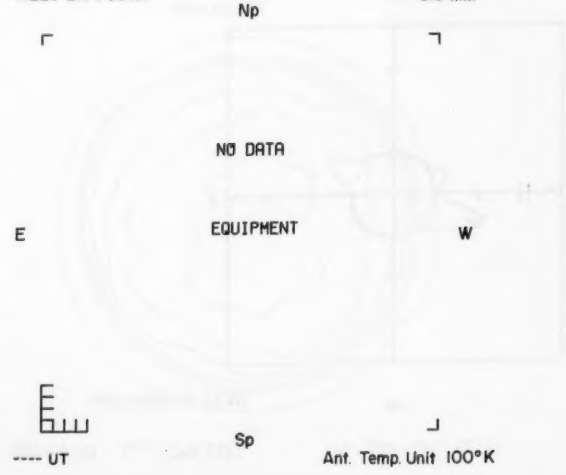



---- UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM



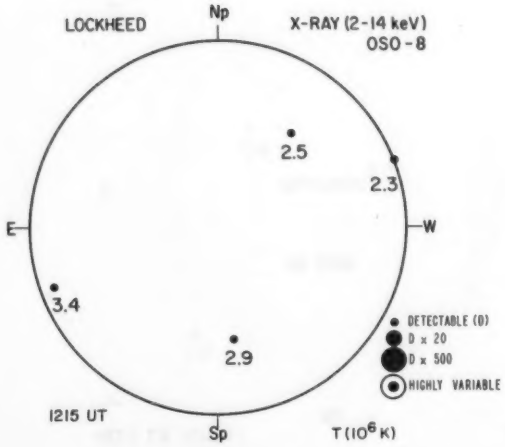

---- UT

Ant. Temp. Unit 100°K

# MARCH 14, 1977 (P = -24.29, $B_o$ = -7.18, $L_o$ = 129.68)

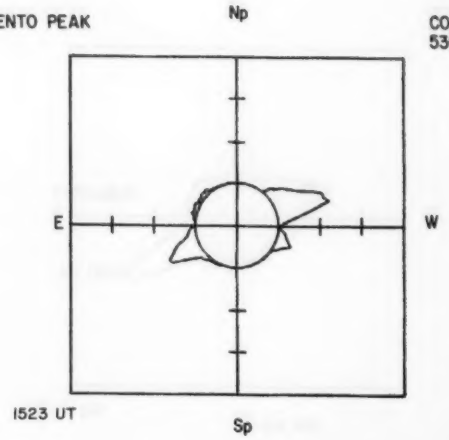
LOCKHEED

X-RAY (2-14 keV)
OSO-8



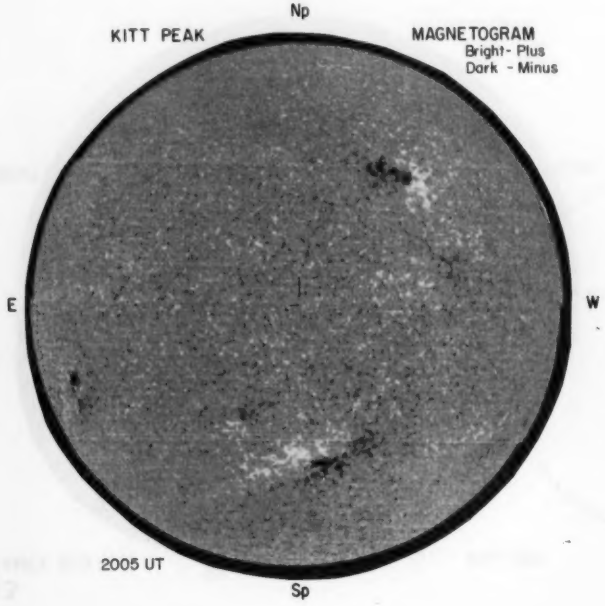

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

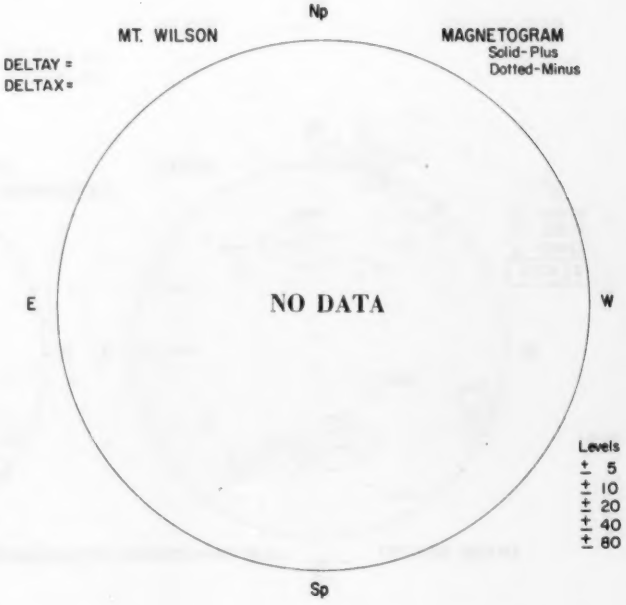
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

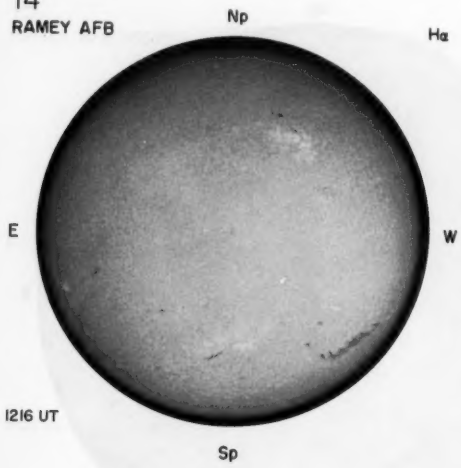
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



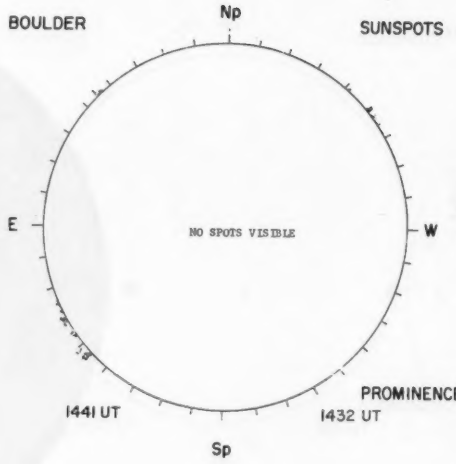
14

RAMEY AFB




1216 UT

Hα BOULDER




1441 UT

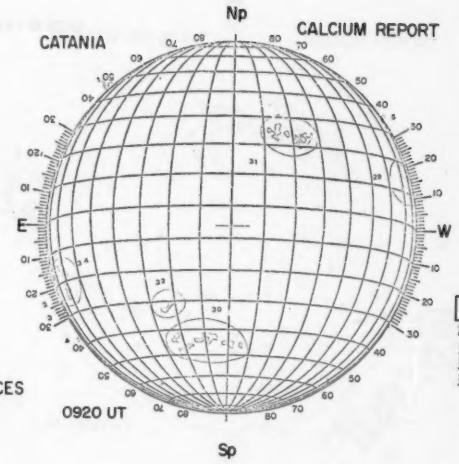
SUNSPOTS

PROMINENCES

1432 UT

CATANIA

CALCIUM REPORT

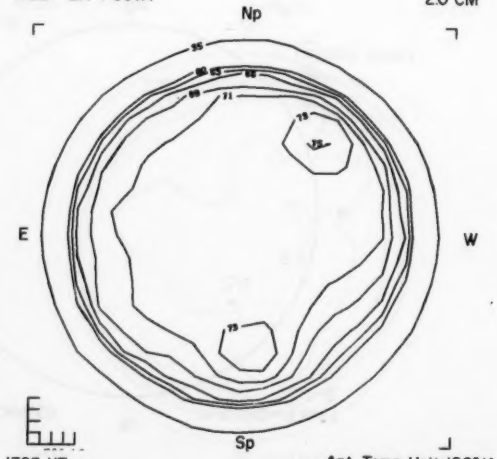



0920 UT

| POOR | EC |
|---|---|
| 29 - 3928 | --- |
| 31 - 1186 | --- |
| 30 - 1154 | --- |
| 34 - 1565 | --- |

NELC LA POSTA

2.0 CM

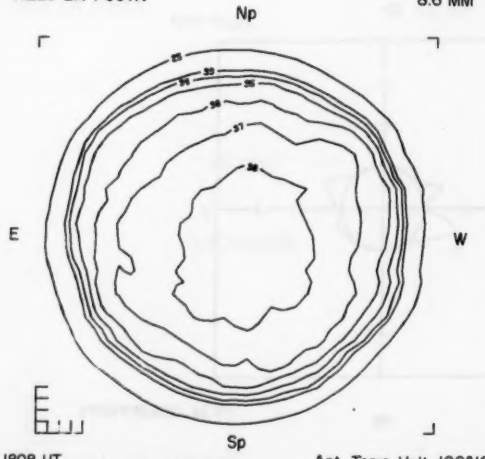



1723 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

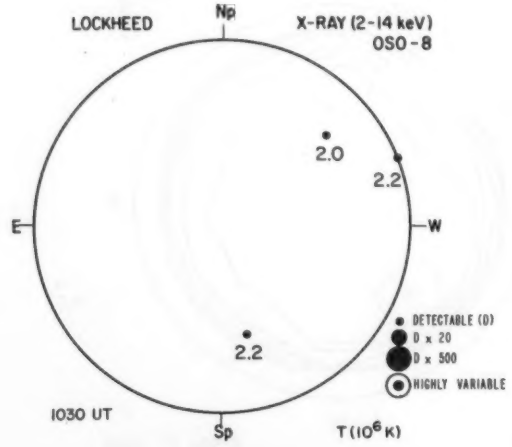
8.6 MM

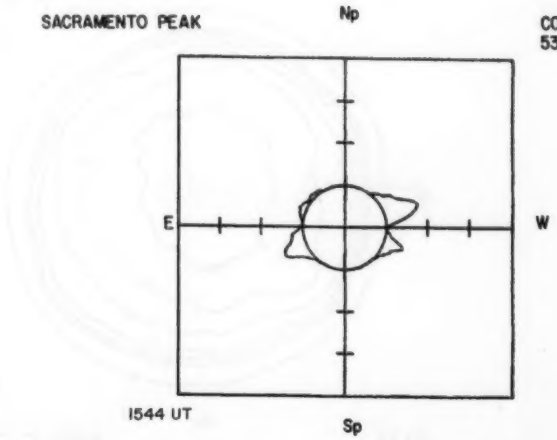


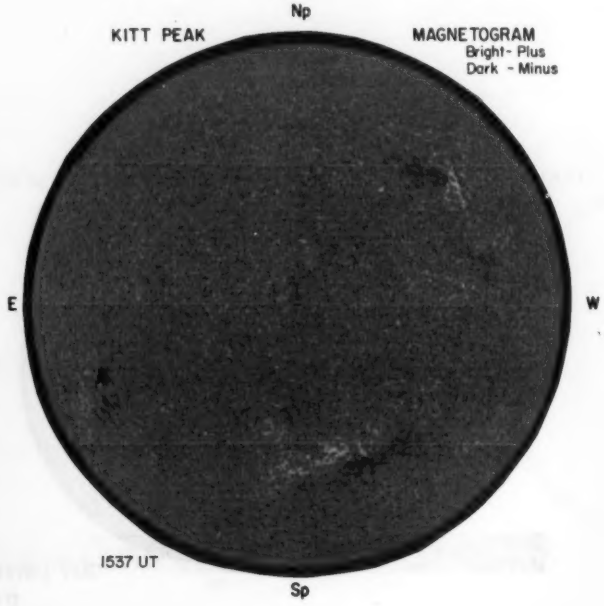

1808 UT

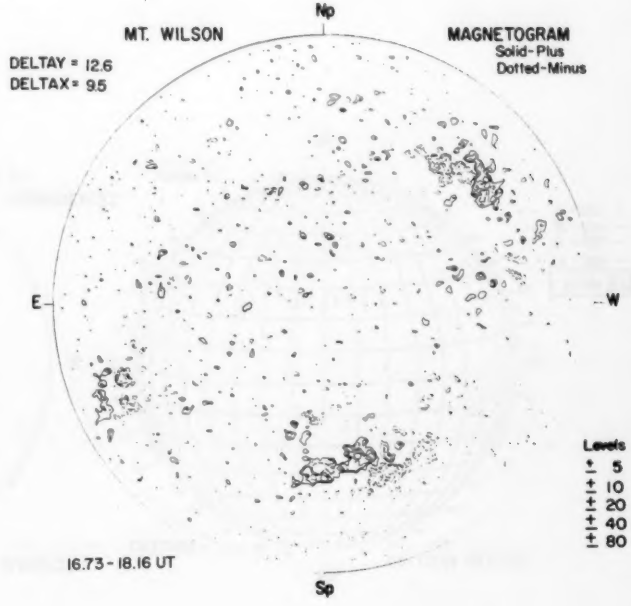
Ant. Temp. Unit 100°K

# MARCH 15, 1977 (P=-24.46, $B_o$=-7.16, $L_o$=116.50)



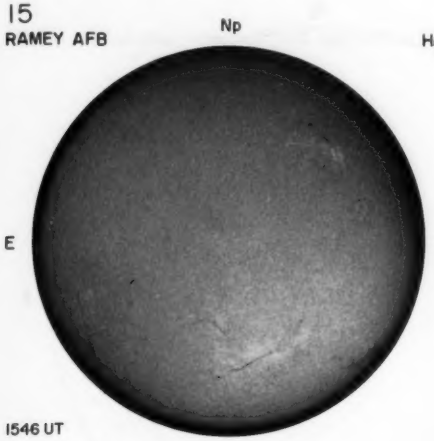



Sp

15

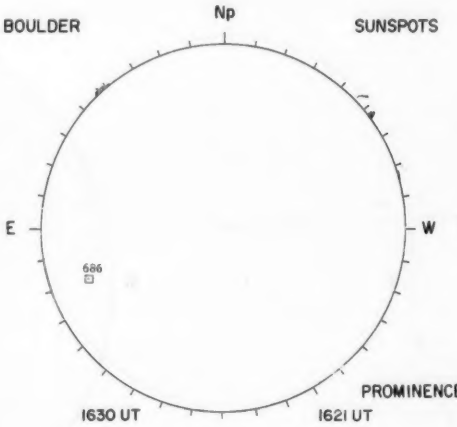
RAMEY AFB




Hα

1546 UT

BOULDER



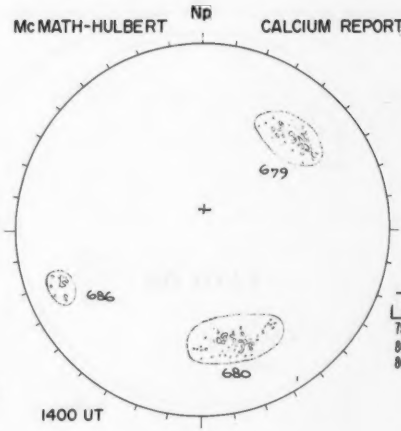

SUNSPOTS

1630 UT

PROMINENCES

1621 UT

McMATH-HULBERT



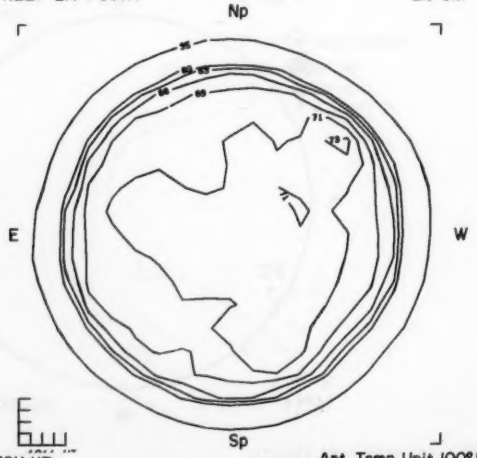

CALCIUM REPORT

| GOOD | M |
|---|---|
| 79 - 1900 - 3.0 | |
| 80 - 1600 - 2.5 | |
| 86 - 0700 - 3.0 | |

1400 UT

NELC LA POSTA

2.0 CM




1911 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM

NO DATA

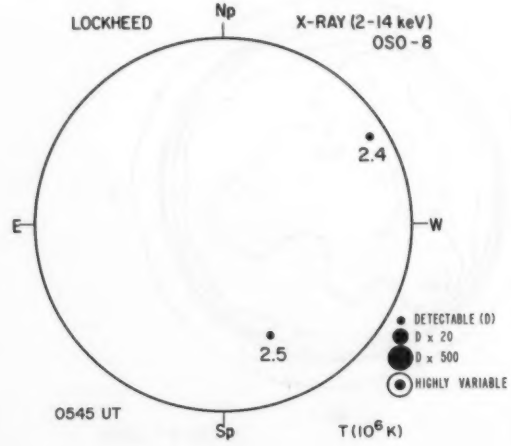
CALIBRATION

---- UT

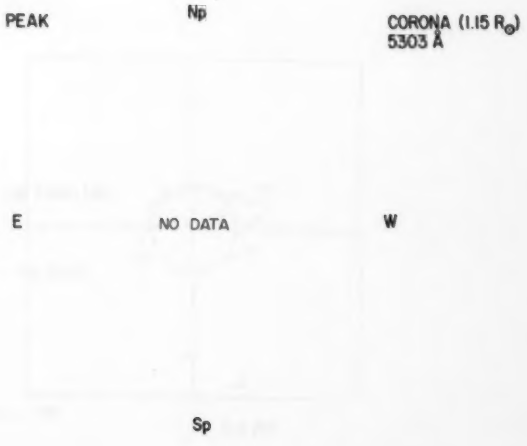
Ant. Temp. Unit 100°K

MARCH 16, 1977 (P=-24.62, $B_o$=-7.14, $L_o$=103.32)

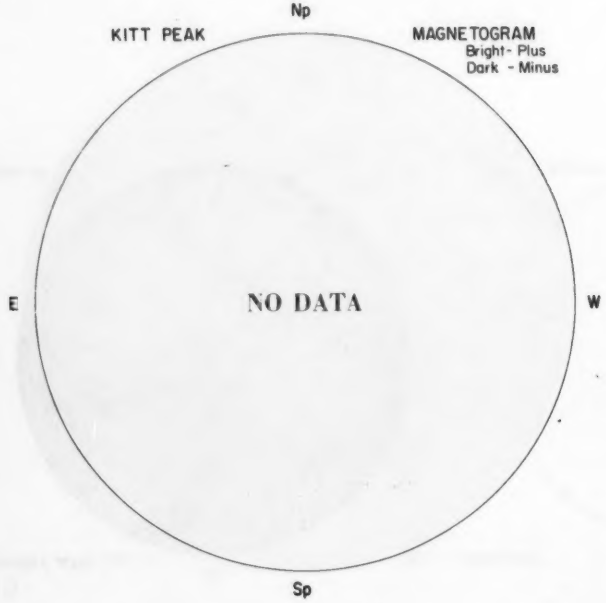
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

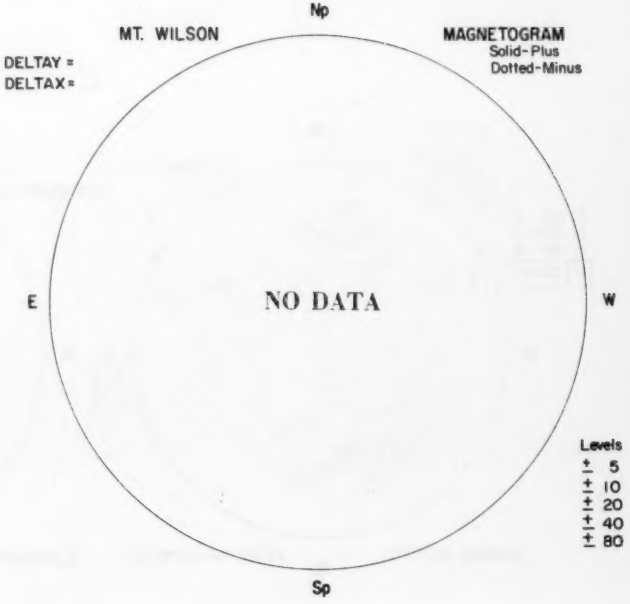



KITT PEAK MAGNETOGRAM Bright-Plus Dark-Minus



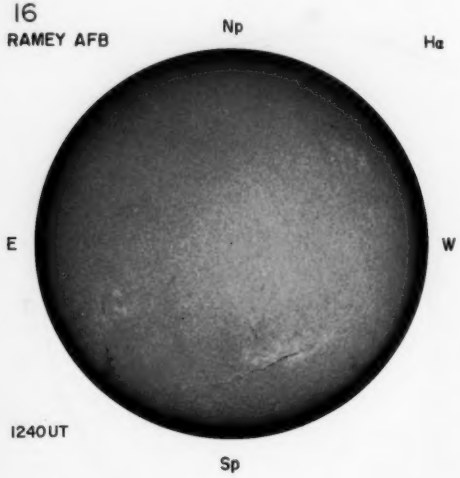

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY =
DELTAX =

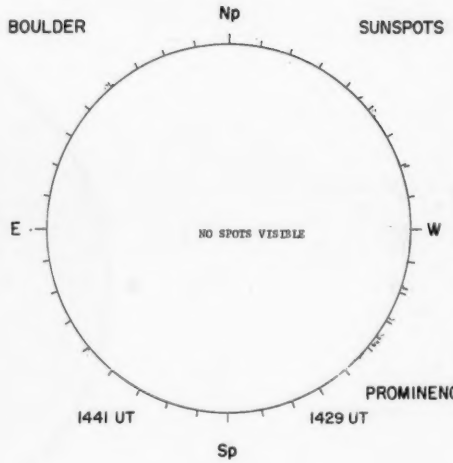


16

RAMEY AFB




Hα BOULDER

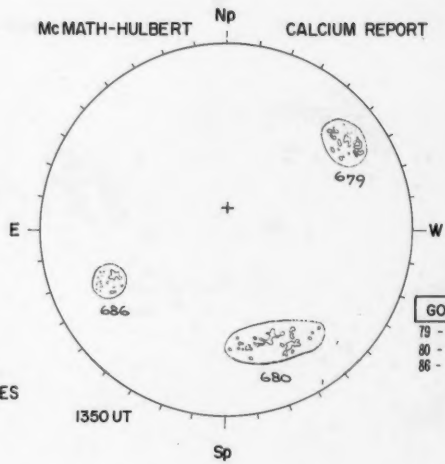



SUNSPOTS

PROMINENCES

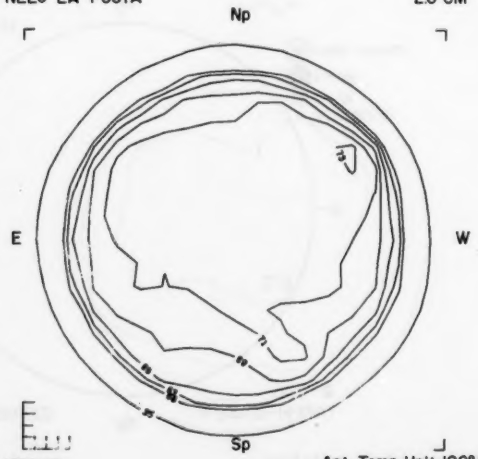
McMATH-HULBERT

CALCIUM REPORT

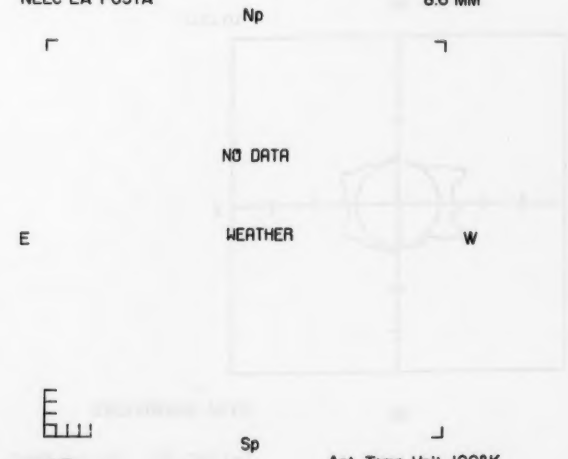



| GOOD | M |
|---|---|
| 79 - 1700-2.5 | |
| 80 - 1700-2.5 | |
| 86 - 0700-2.5 | |

NELC LA POSTA 2.0 CM

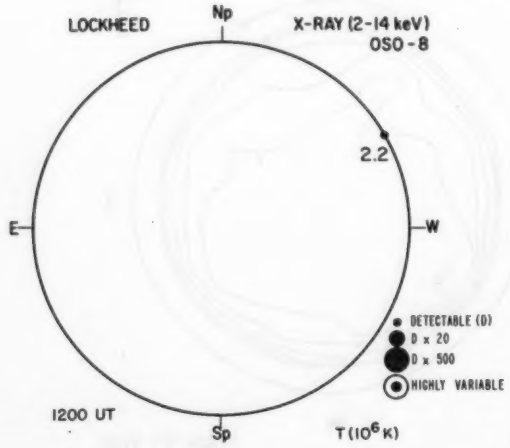



NELC LA POSTA 8.6 MM



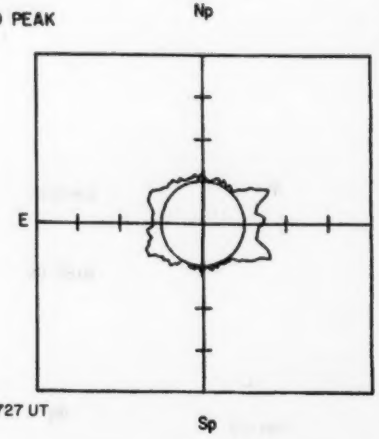
# MARCH 17, 1977 (P =-24.77, $B_o$ =-7.12, $L_o$ = 90.14)

LOCKHEED
X-RAY (2-14 keV)
OSO-8



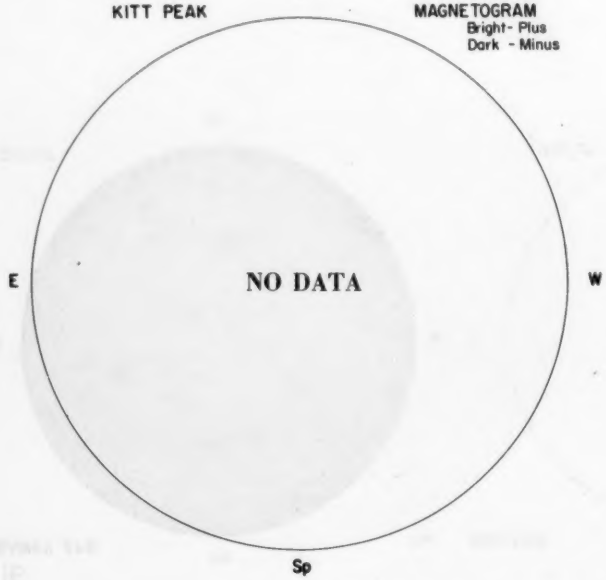

1200 UT
T ($10^6$ K)

SACRAMENTO PEAK
CORONA (1.15 $R_\odot$)
5303 Å

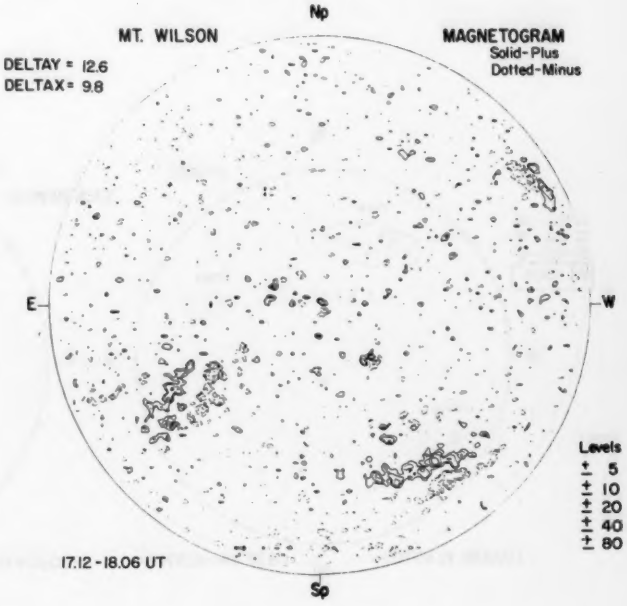



1727 UT

KITT PEAK
MAGNETOGRAM
Bright- Plus
Dark - Minus



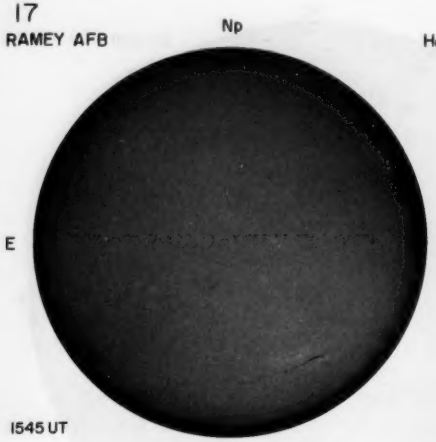

MT. WILSON
MAGNETOGRAM
Solid- Plus
Dotted-Minus
DELTAY = 12.6
DELTAX = 9.8




17.12 - 18.06 UT

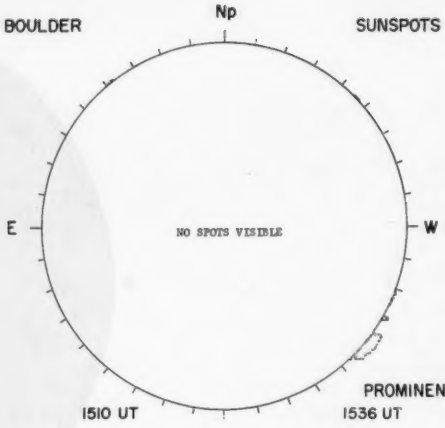
17

RAMEY AFB




1545 UT

Hα BOULDER




1510 UT

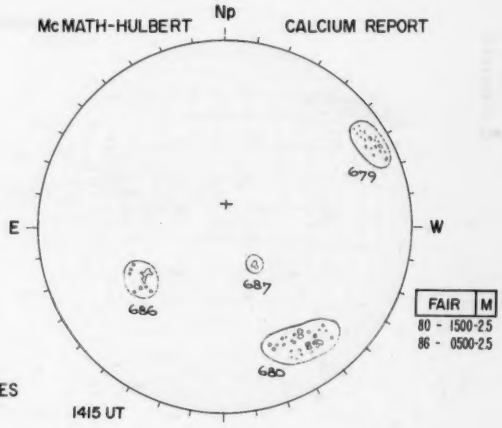
SUNSPOTS

PROMINENCES

1536 UT

McMATH-HULBERT

CALCIUM REPORT




1415 UT

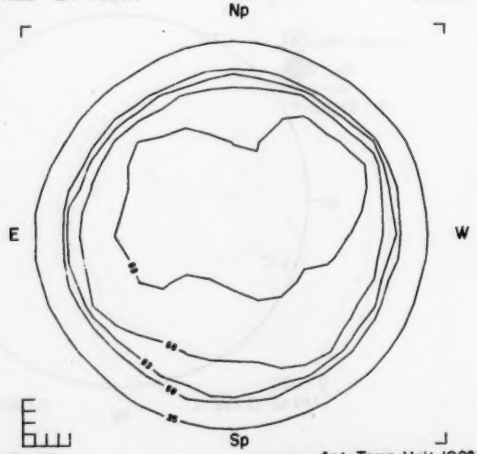
FAIR | M

80 - 1500-2.5

86 - 0500-2.5

NELC LA POSTA

2.0 CM




1711 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM

NO DATA

CLOUDY

1753 UT

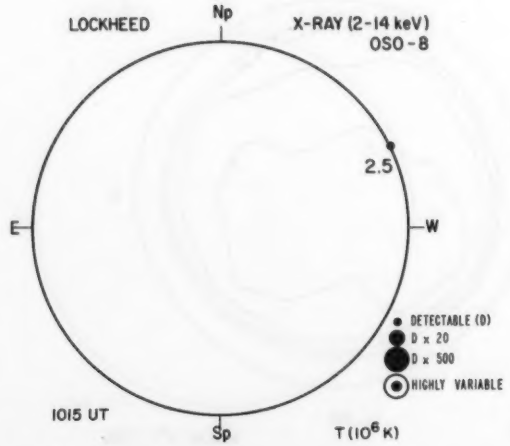
Ant. Temp. Unit 100°K

67

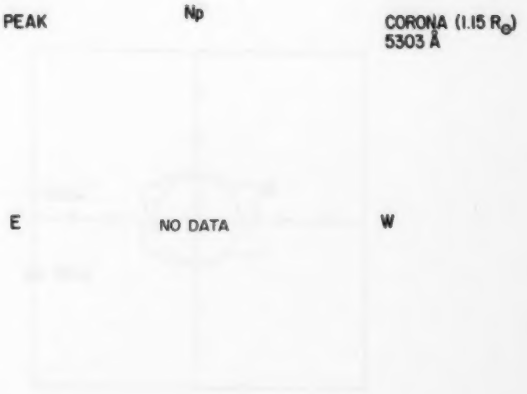
Mar 77

MARCH 18, 1977 (P =-24.91, $B_o$ =-7.10, $L_o$ = 76.95)

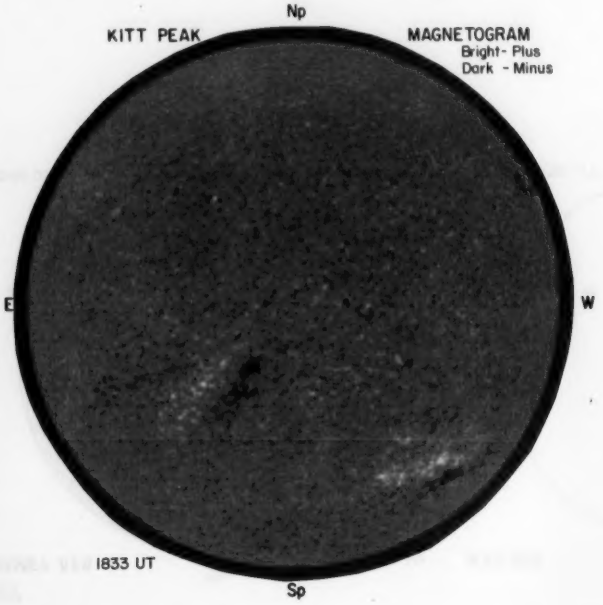
LOCKHEED



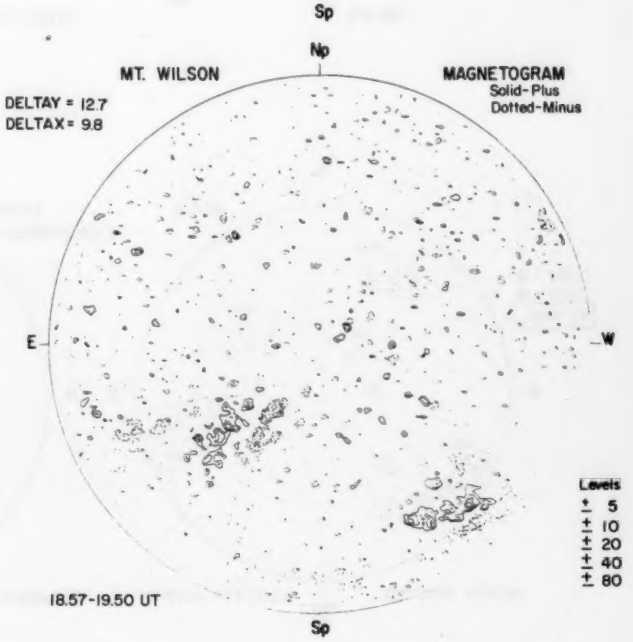

SACRAMENTO PEAK




KITT PEAK

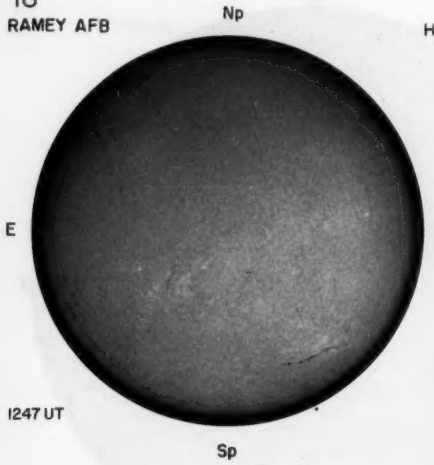



MT. WILSON



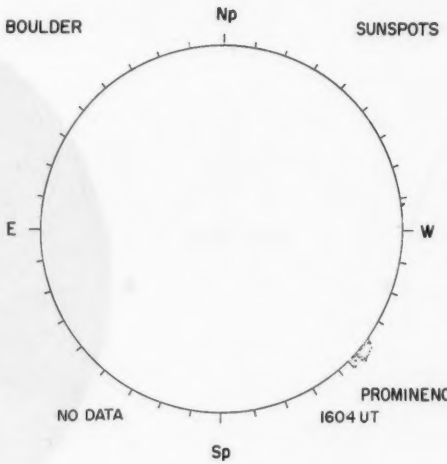
18

RAMEY AFB




1247 UT

Hα BOULDER




NO DATA

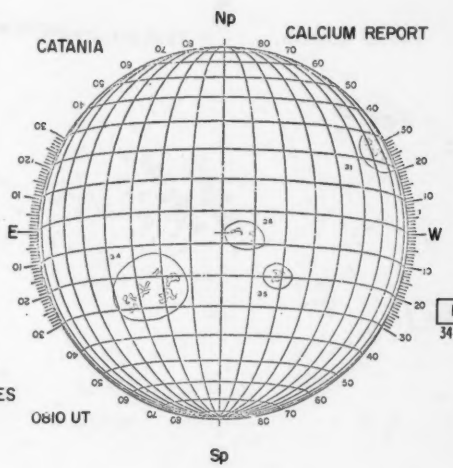
SUNSPOTS

PROMINENCES

1604 UT

CATANIA

CALCIUM REPORT

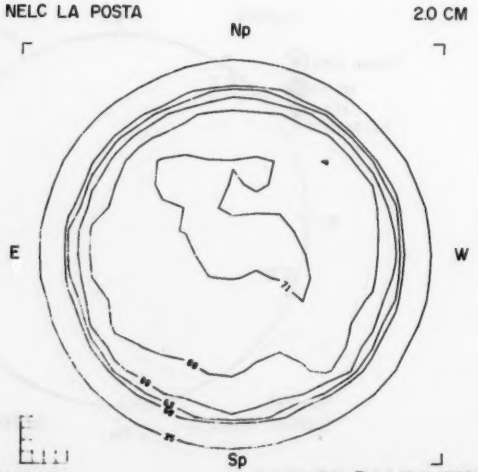



FAIR EC

34 - 1850---

0810 UT

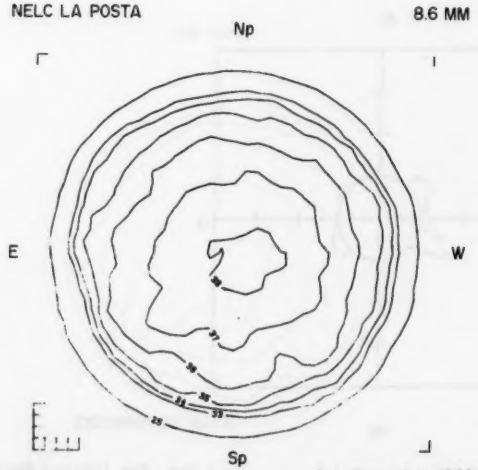
NELC LA POSTA 2.0 CM




1659 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

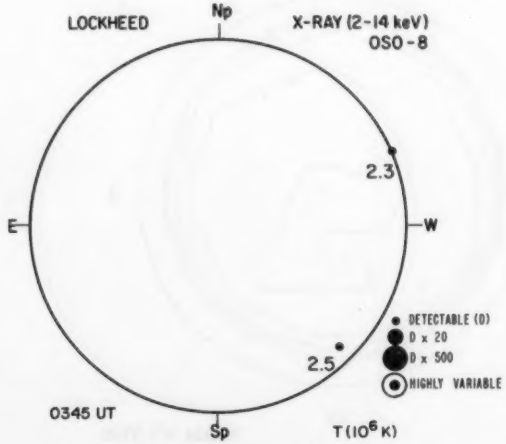



1743 UT

Ant. Temp. Unit 100°K

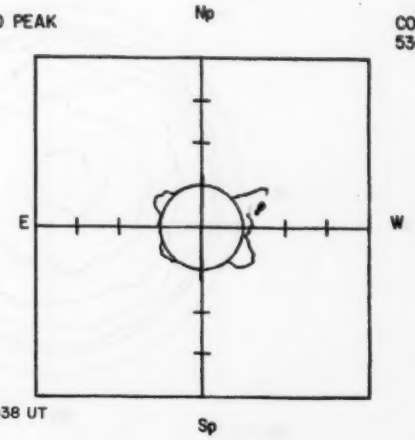
# MARCH 19, 1977 (P = -25.05, $B_0$ = -7.07, $L_0$ = 63.77)

LOCKHEED
X-RAY (2-14 keV)
OSO-8




0345 UT
T($10^6$ K)

SACRAMENTO PEAK
CORONA (1.15 $R_\odot$)
5303 Å

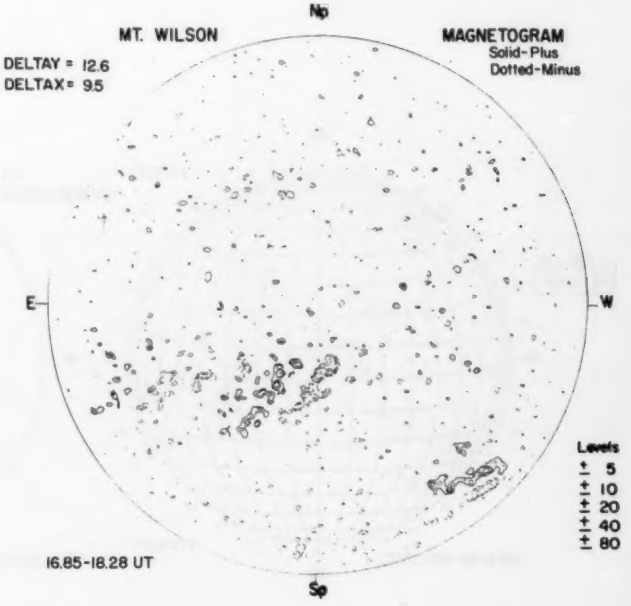



1538 UT

KITT PEAK
MAGNETOGRAM
Bright - Plus
Dark - Minus

1546 UT

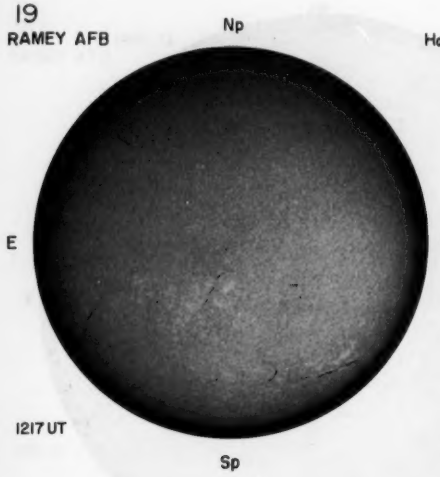
MT. WILSON
MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5




16.85-18.28 UT

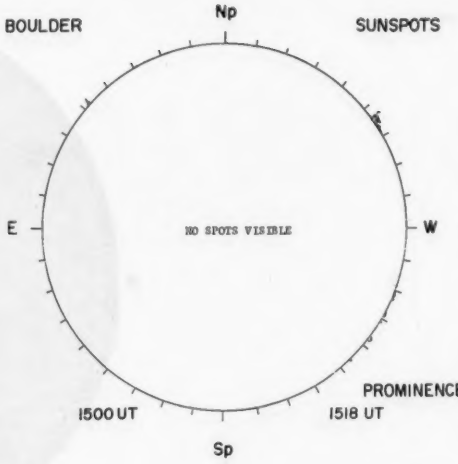
19

RAMEY AFB




1217 UT

Hα BOULDER



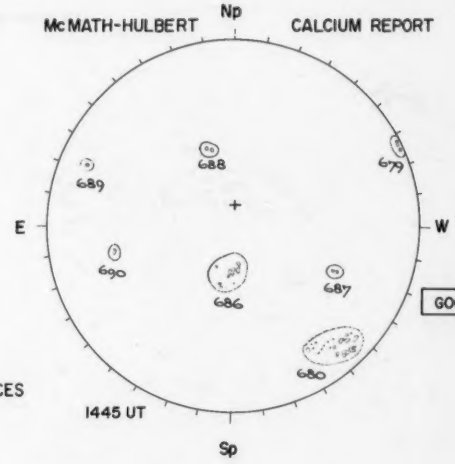

1500 UT

SUNSPOTS

1518 UT

PROMINENCES

McMATH-HULBERT

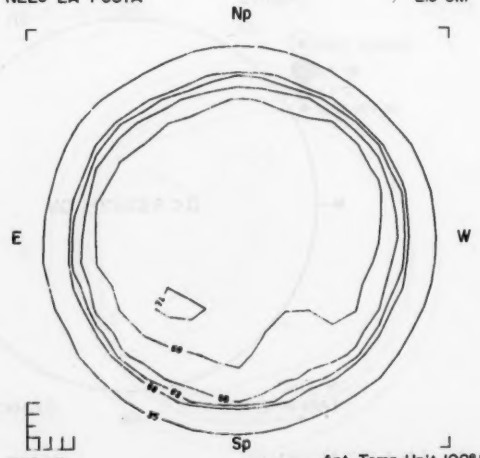



1445 UT

CALCIUM REPORT

GOOD | M

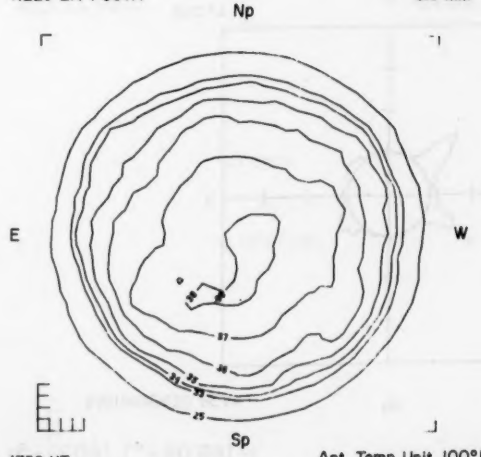
NELC LA POSTA 2.0 CM




1658 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM




1759 UT

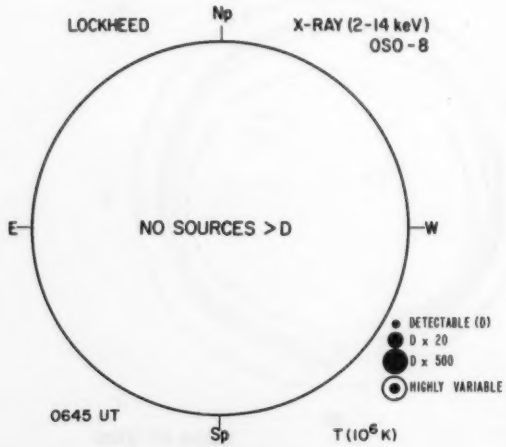
Ant. Temp. Unit 100°K

71
Mar 77

# MARCH 20, 1977 (P=-25.18, $B_o$=-7.04, $L_o$=50.59)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

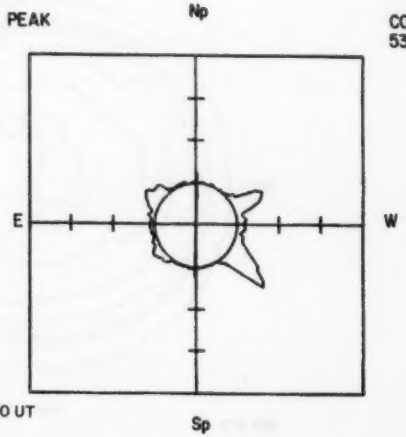



0645 UT

T($10^6$K)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




1510 UT

KITT PEAK

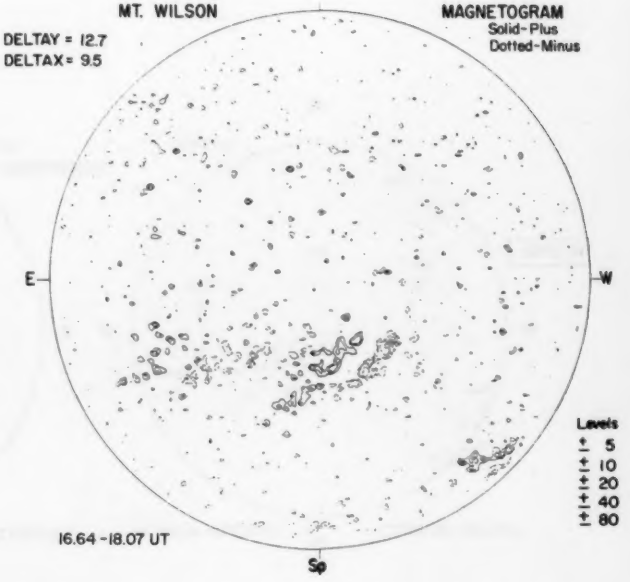
MAGNETOGRAM
Bright - Plus
Dark - Minus

1652 UT

MT. WILSON

DELTAY = 12.7
DELTAX = 9.5

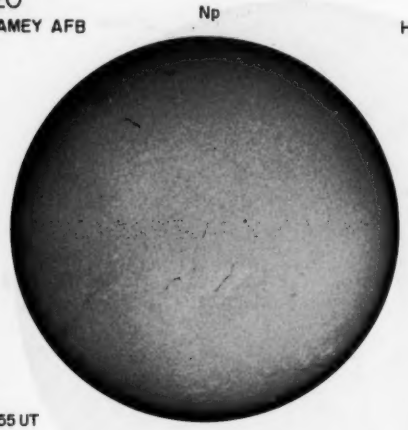
MAGNETOGRAM
Solid - Plus
Dotted - Minus




16.64 - 18.07 UT

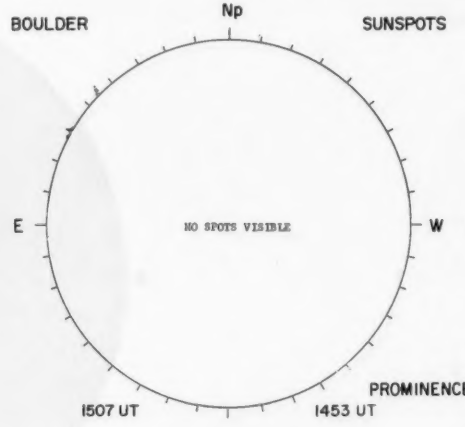
20

RAMEY AFB




1155 UT

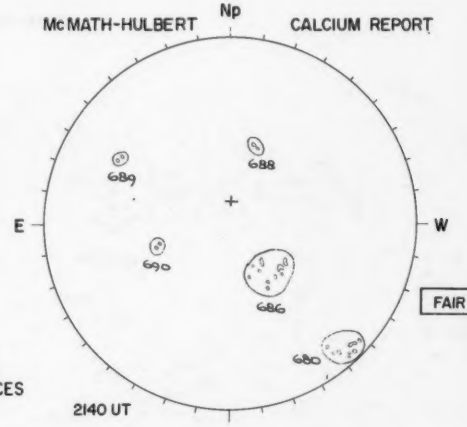
Hα BOULDER




1507 UT 1453 UT

SUNSPOTS

McMATH-HULBERT



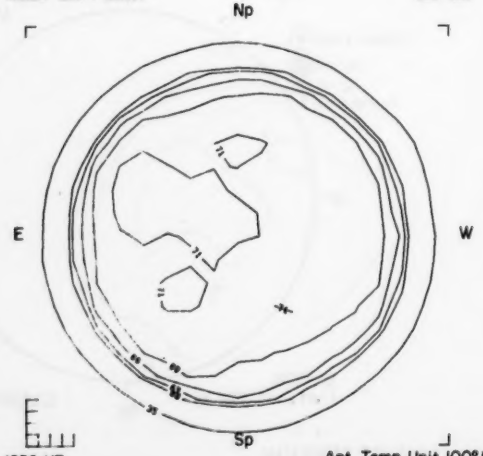

2140 UT

CALCIUM REPORT

FAIR | M

PROMINENCES

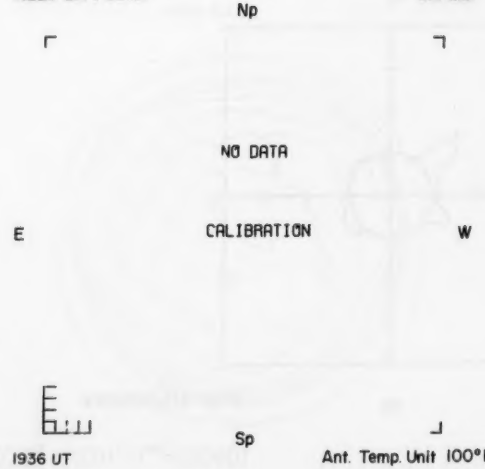
NELC LA POSTA 2.0 CM




1856 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM



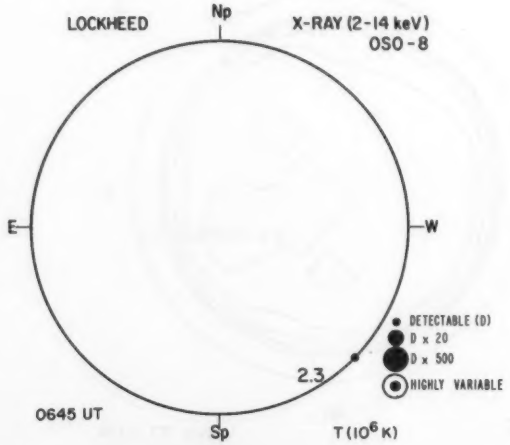

1936 UT

Ant. Temp. Unit 100°K

73
Mar 77

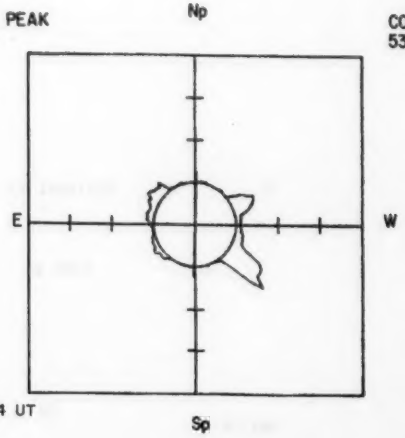
# MARCH 21, 1977 (P=-25.30, $B_0$=-7.01, $L_0$=37.40)

LOCKHEED X-RAY (2-14 keV) OSO-8



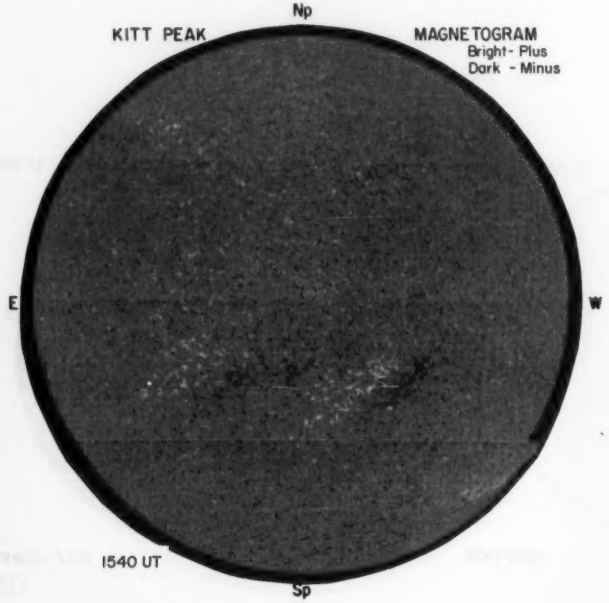

0645 UT

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å




1524 UT

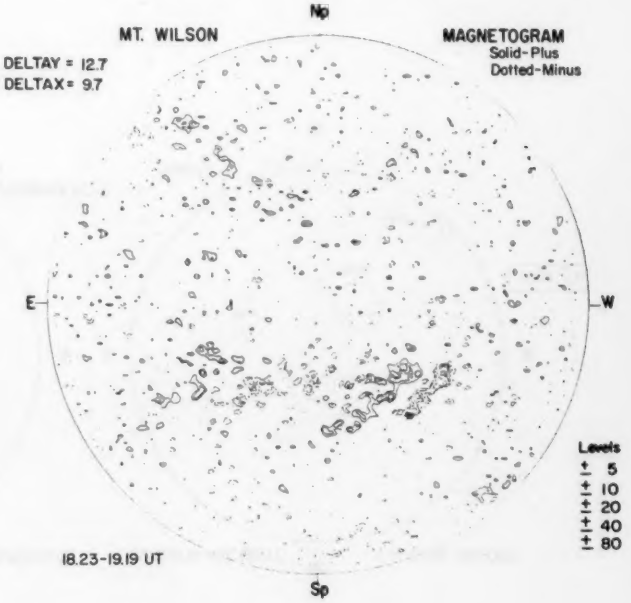
KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1540 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

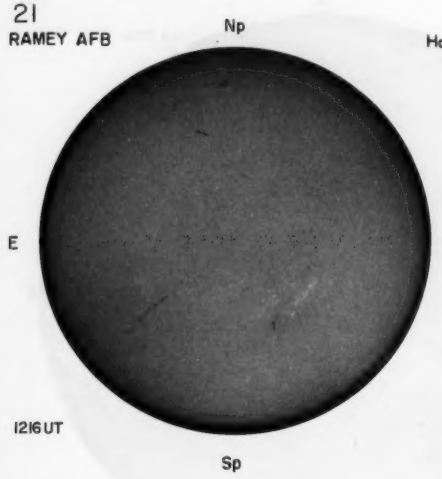
DELTAY = 12.7
DELTAX = 9.7




18.23-19.19 UT

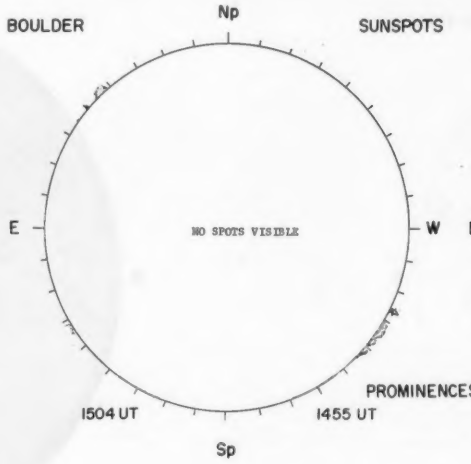
21

RAMEY AFB




1216 UT

Hα BOULDER



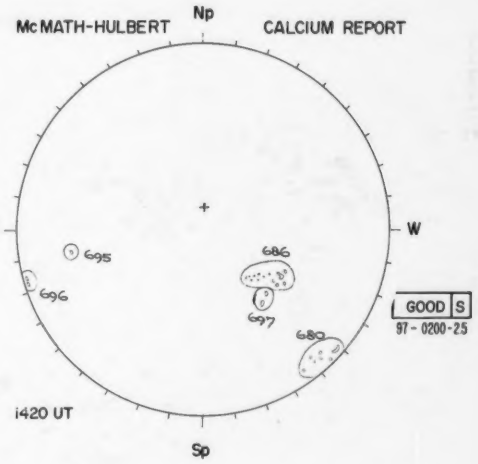

1504 UT

SUNSPOTS

1455 UT

PROMINENCES

McMATH-HULBERT



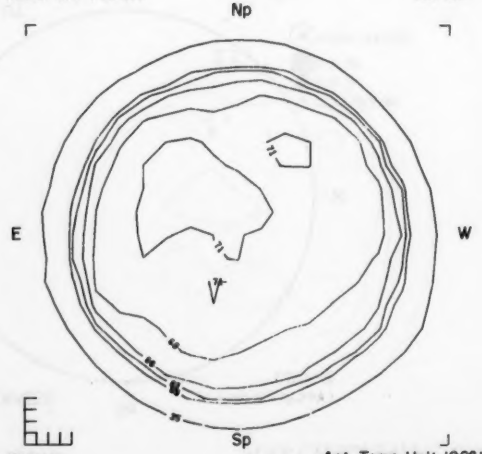

1420 UT

CALCIUM REPORT

GOOD | S

97 - 0200 - 25

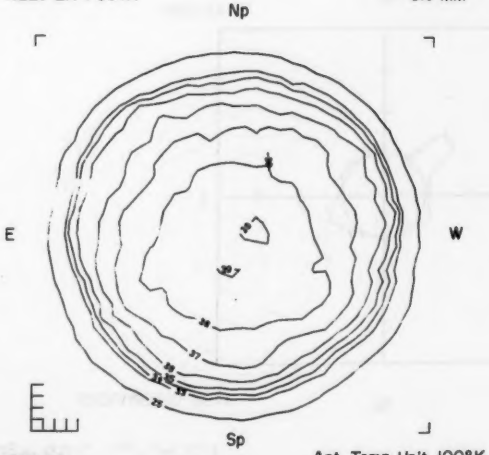
NELC LA POSTA 2.0 CM




1705 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM



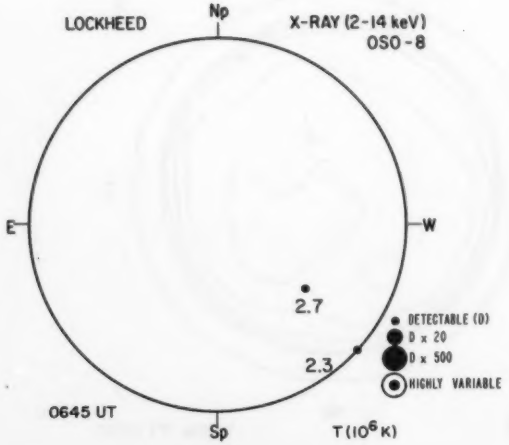

1748 UT

Ant. Temp. Unit 100°K

75
Mar 77

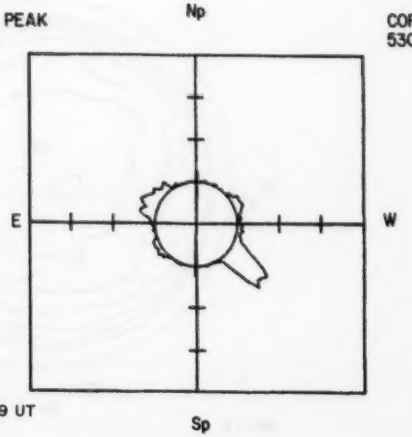
# MARCH 22, 1977 (P=-25.42, $B_o$=-6.97, $L_o$=24.22)

LOCKHEED X-RAY (2-14 keV) OSO-8



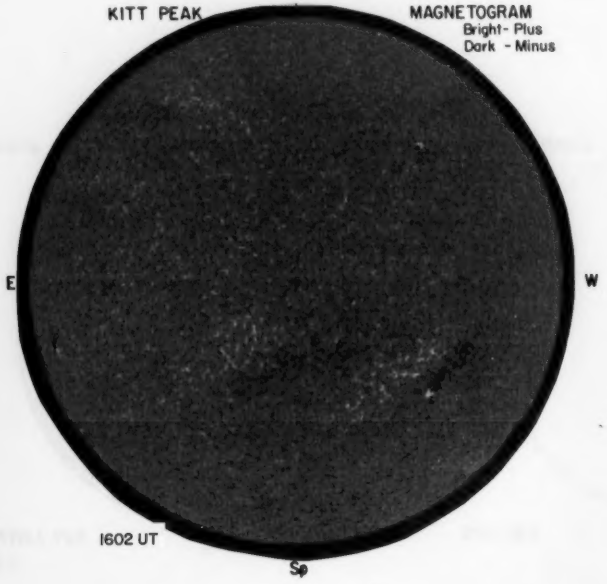

0645 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å




1509 UT

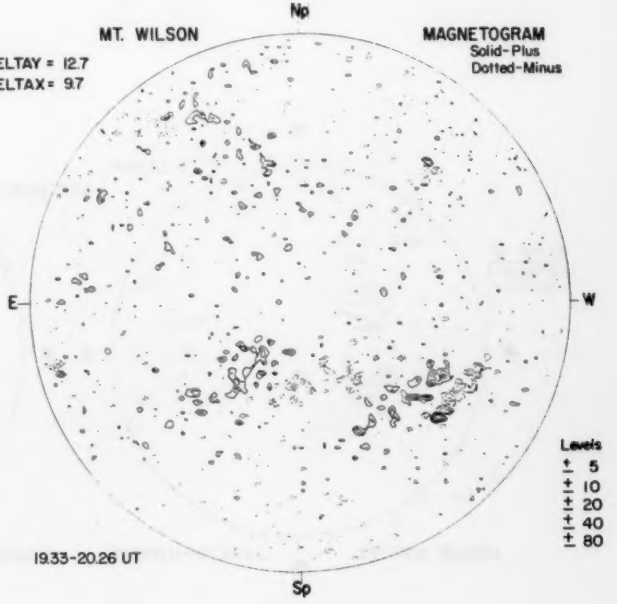
KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1602 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

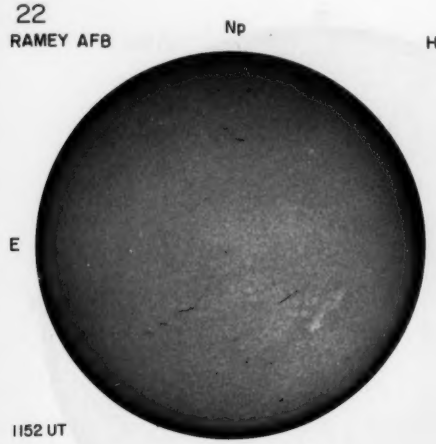
DELTAY = 12.7
DELTAX = 9.7




19.33-20.26 UT

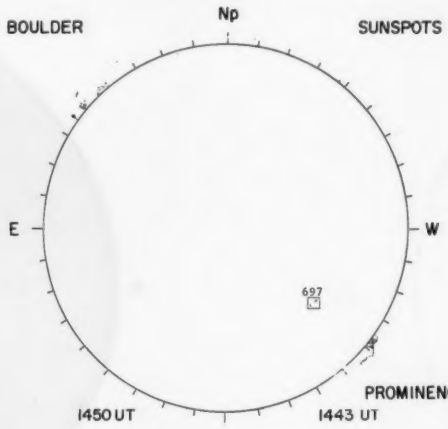
22

RAMEY AFB




1152 UT

Hα BOULDER




1450 UT

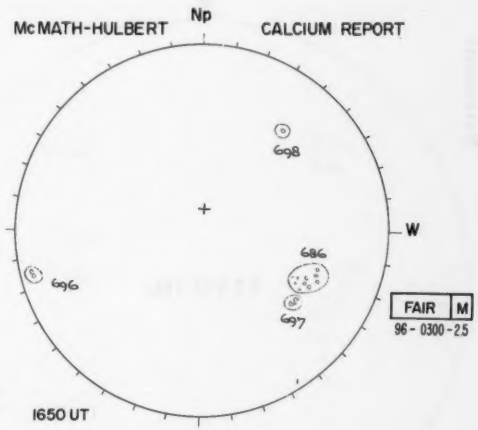
SUNSPOTS

PROMINENCES

1443 UT

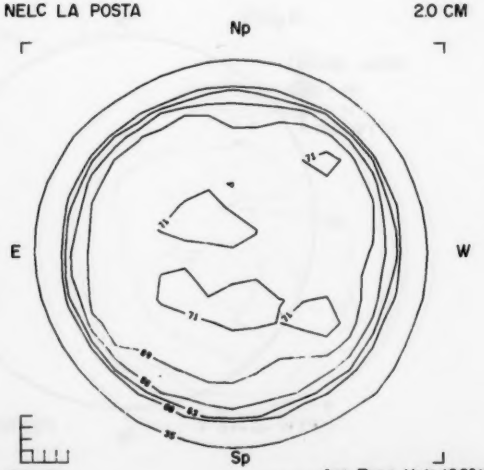
McMATH-HULBERT

CALCIUM REPORT




1650 UT

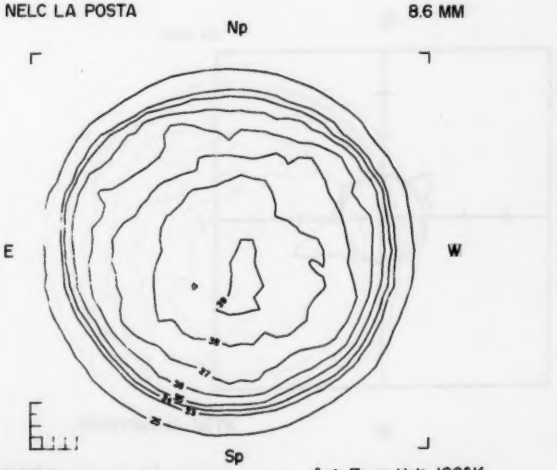
NELC LA POSTA 2.0 CM




1713 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM



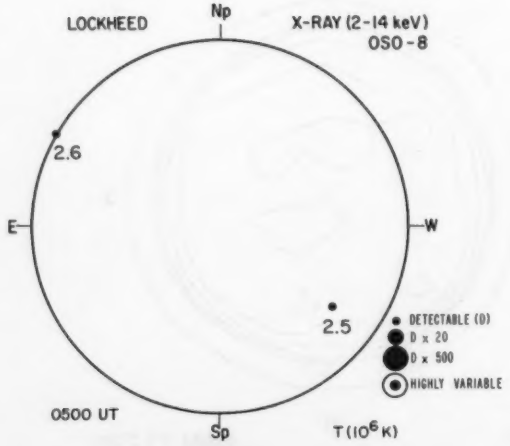

1809 UT

Ant. Temp. Unit 100°K

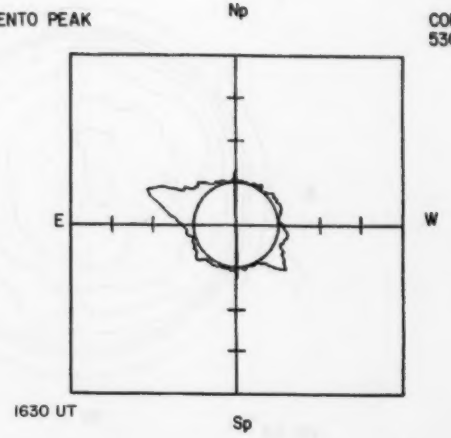
77
Mar 77

# MARCH 23, 1977 (P =-25.53, $B_0$ =-6.94, $L_0$ =11.03)

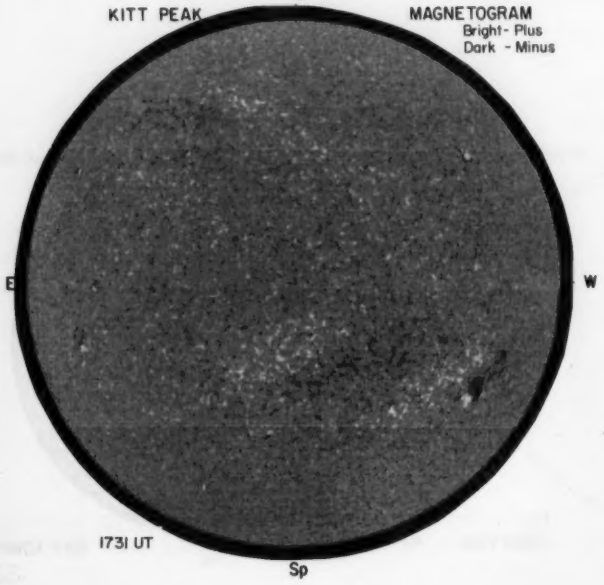
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

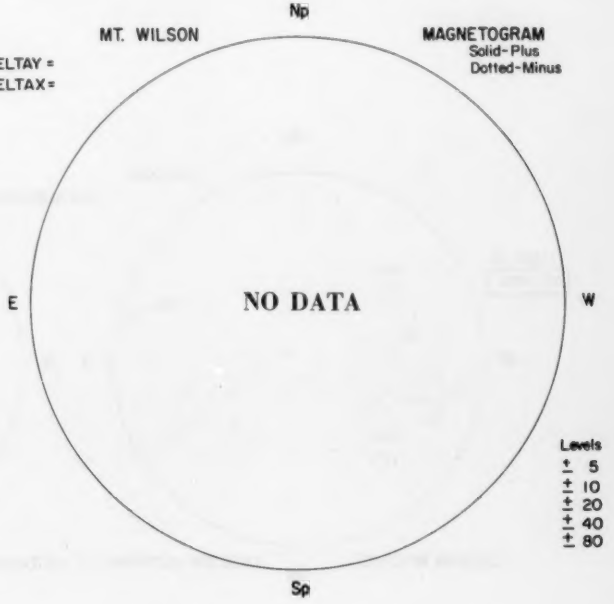



KITT PEAK MAGNETOGRAM Bright- Plus Dark - Minus



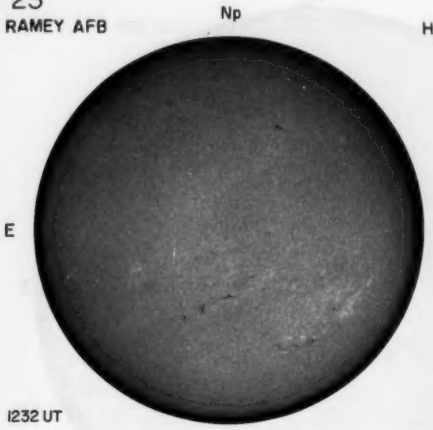

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY =
DELTAX =



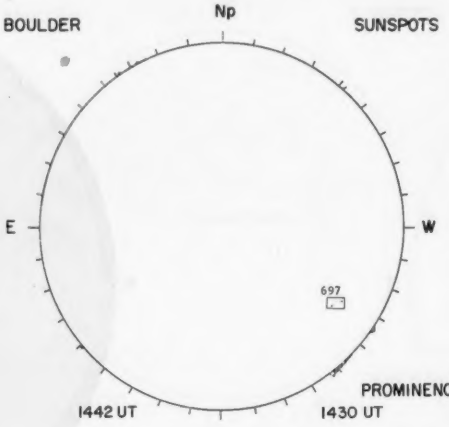
23

RAMEY AFB




1232 UT

Hα BOULDER

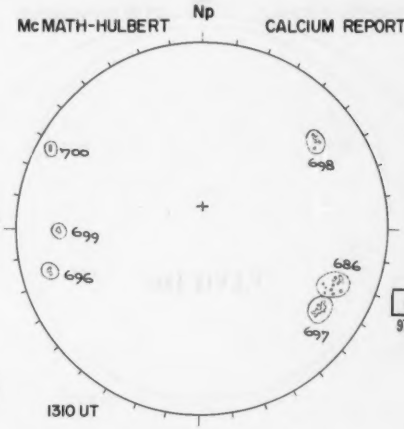



1442 UT

SUNSPOTS

1430 UT

McMATH-HULBERT




1310 UT

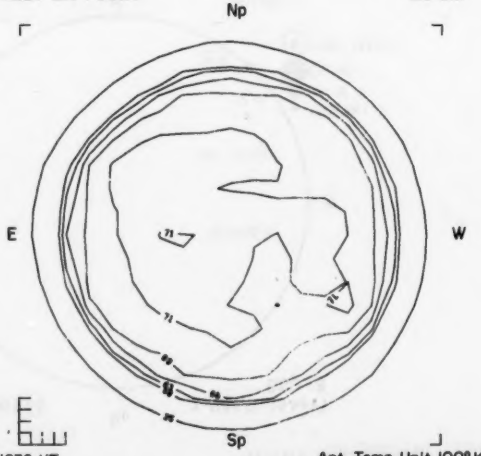
CALCIUM REPORT

GOOD | S

97 - 0500 - 2.5

PROMINENCES

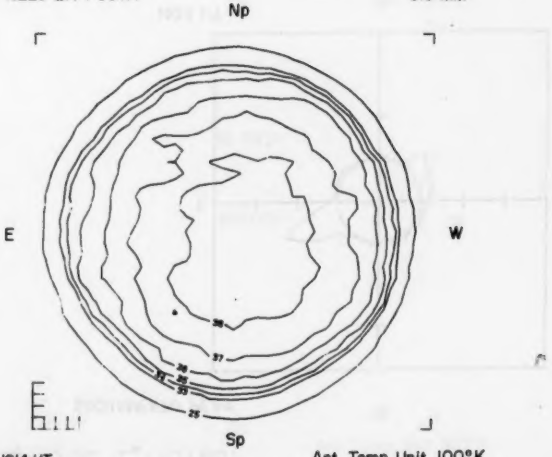
NELC LA POSTA 2.0 CM




1832 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

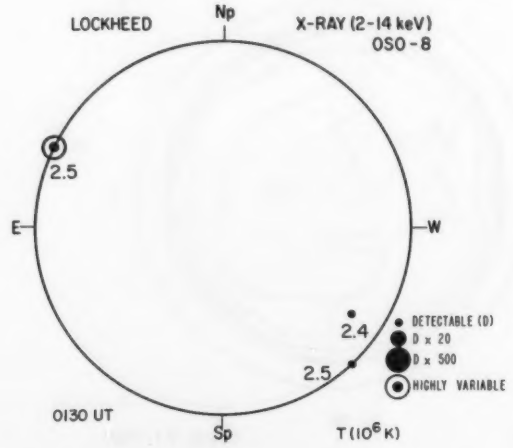


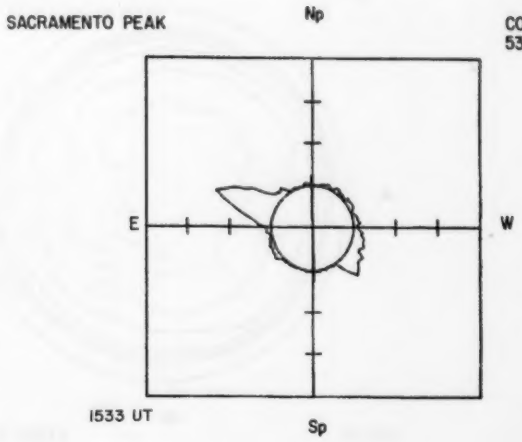

1914 UT

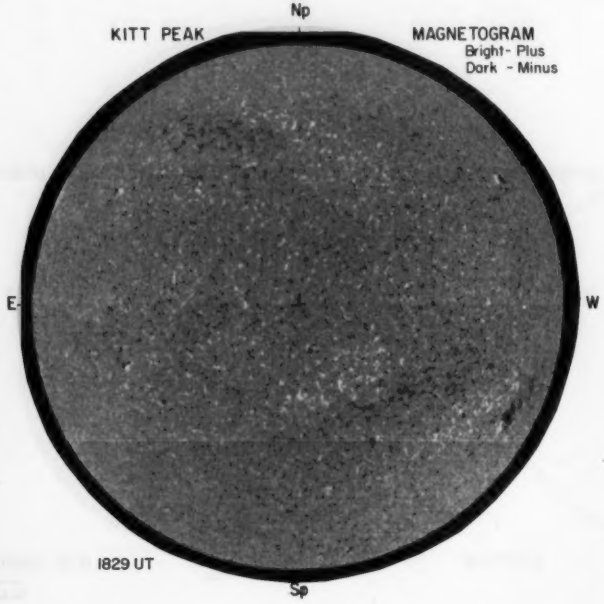
Ant. Temp. Unit 100°K

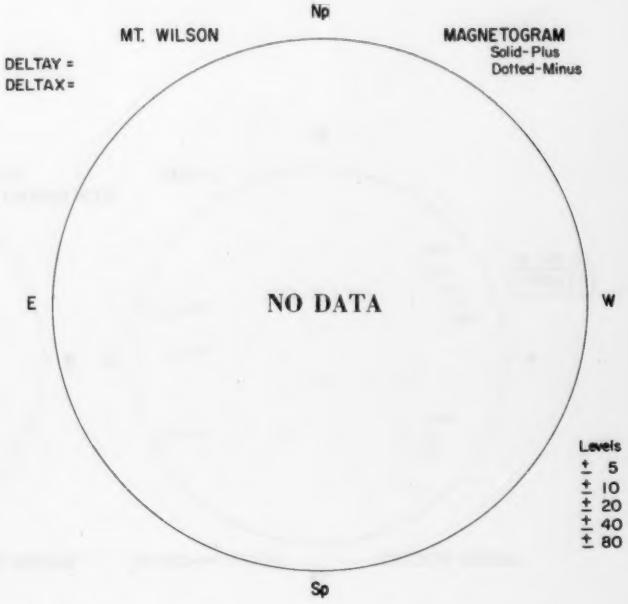
79
Mar 77

# MARCH 24, 1977 (P = -25.63, $B_o$ = -6.90, $L_o$ = 357.85)



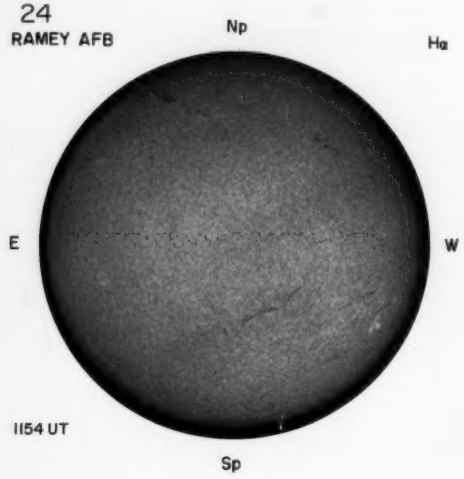



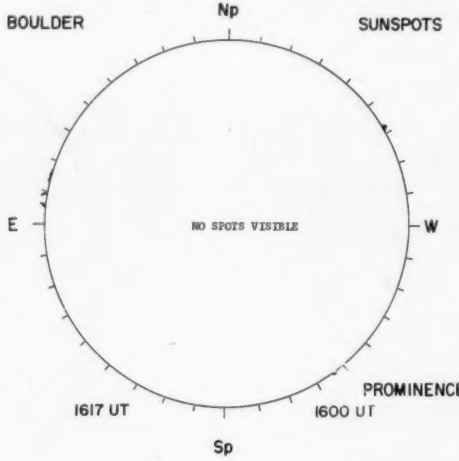



24

RAMEY AFB



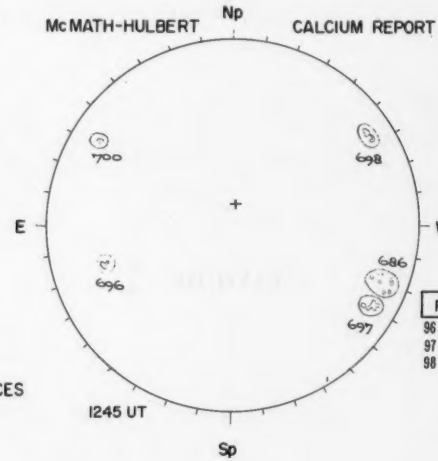

Hα BOULDER




SUNSPOTS

PROMINENCES

McMATH-HULBERT



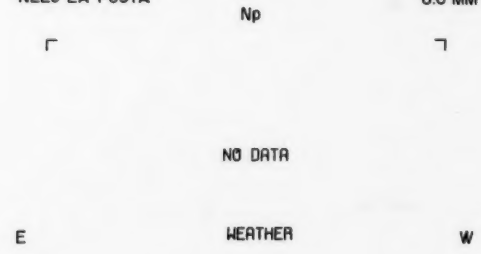

CALCIUM REPORT

| FAIR | M |
|---|---|
| 96 - 0300 - 25 | |
| 97 - 0700 - 30 | |
| 98 - 0400 - 30 | |

NELC LA POSTA

2.0 CM

NELC LA POSTA



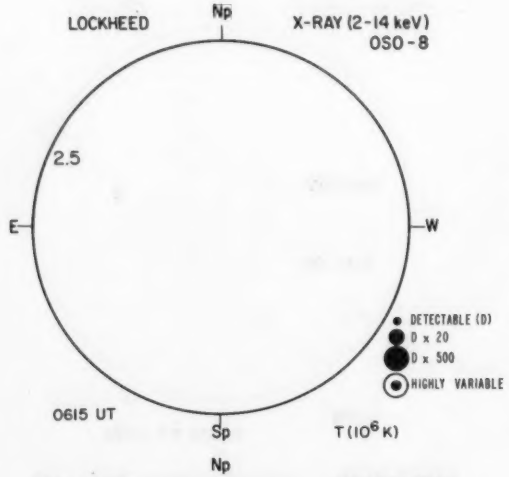

8.6 MM

81
Mar 77

# MARCH 25, 1977 (P=-25.73, $B_o$=-6.86, $L_o$=344.66)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

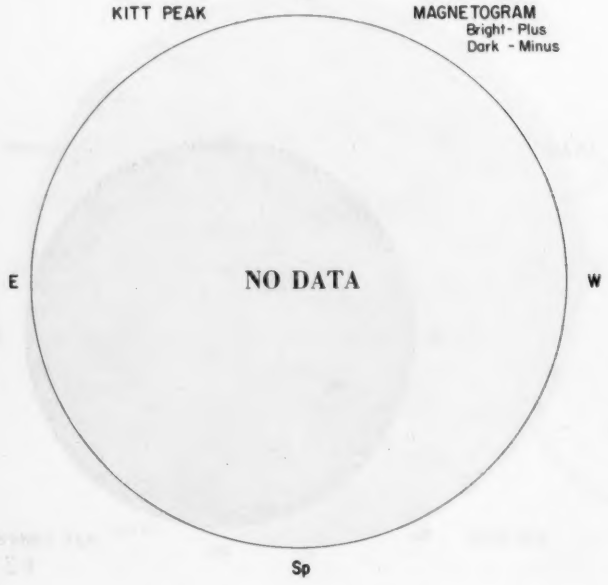



SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

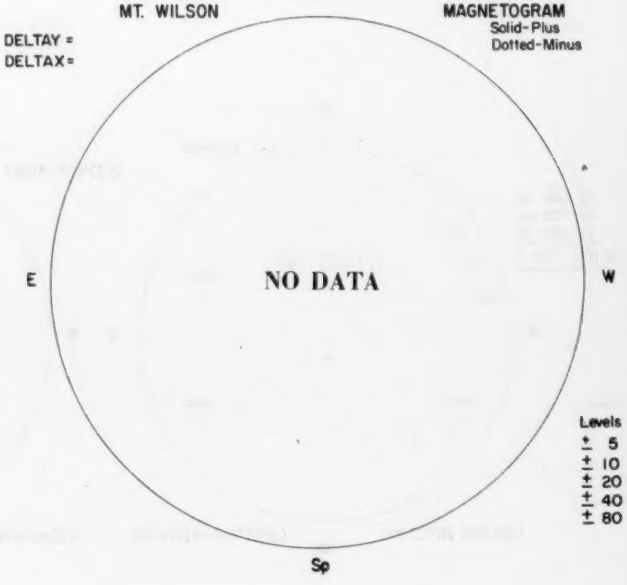
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



Sp

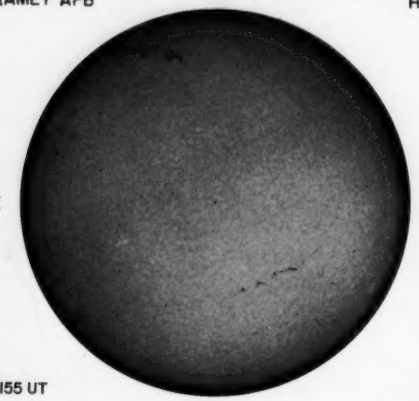
Sp

25

RAMEY AFB

Np

Hα



E

W

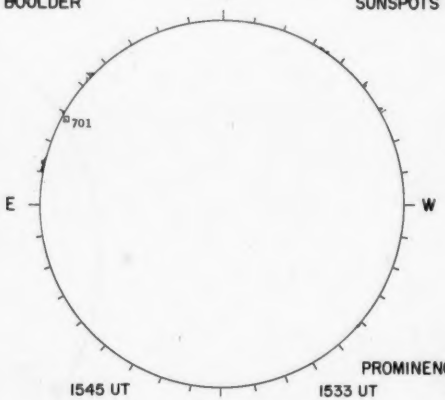
1155 UT

Sp

BOULDER

Np

SUNSPOTS




E

W

1545 UT

Sp

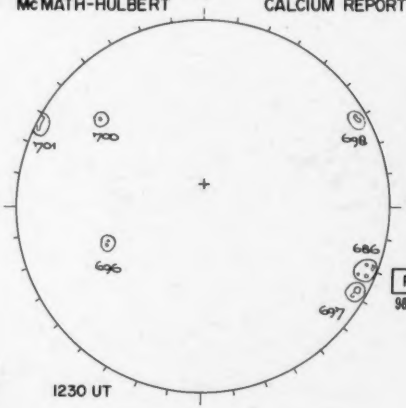
PROMINENCES

1533 UT

McMATH-HULBERT

Np

CALCIUM REPORT




E

W

POOR | S

98 - 0300 - 25

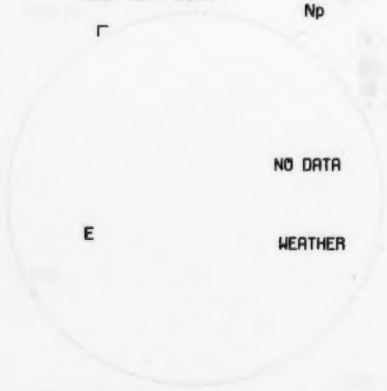
1230 UT

Sp

NELC LA POSTA

Np

2.0 CM



NO DATA

E

WEATHER

W

Sp

---- UT

Ant. Temp. Unit 100° K

NELC LA POSTA

Np

8.6 MM

NO DATA

E

WEATHER

W

Sp

---- UT

Ant. Temp. Unit 100° K

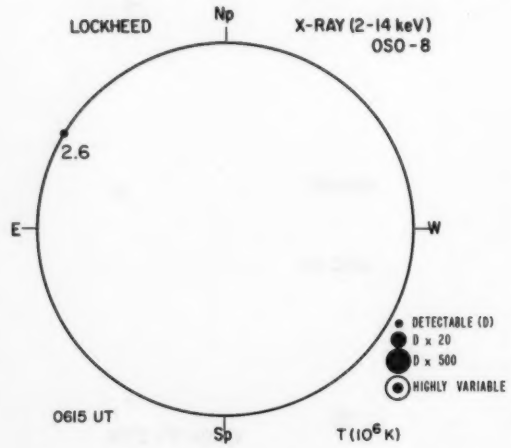
83

Mar 77

# MARCH 26, 1977 (P =-25.82, $B_0$ =-6.82, $L_0$ = 331.47)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

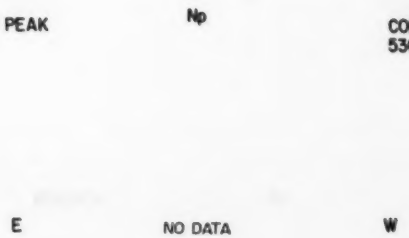



0615 UT

T ($10^6$ K)

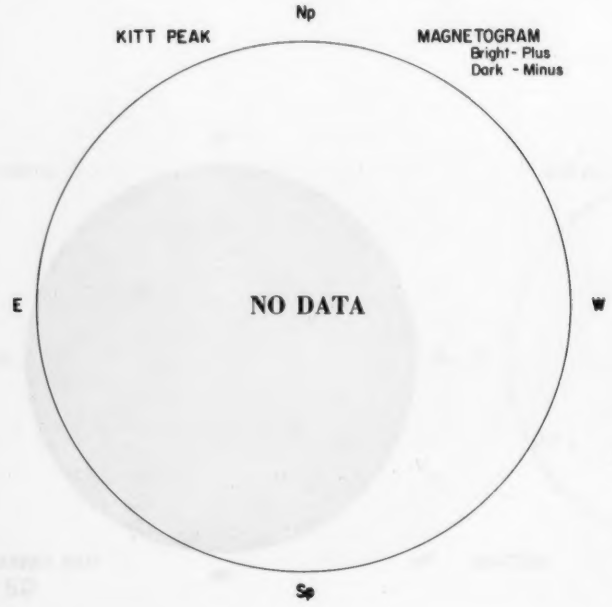
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

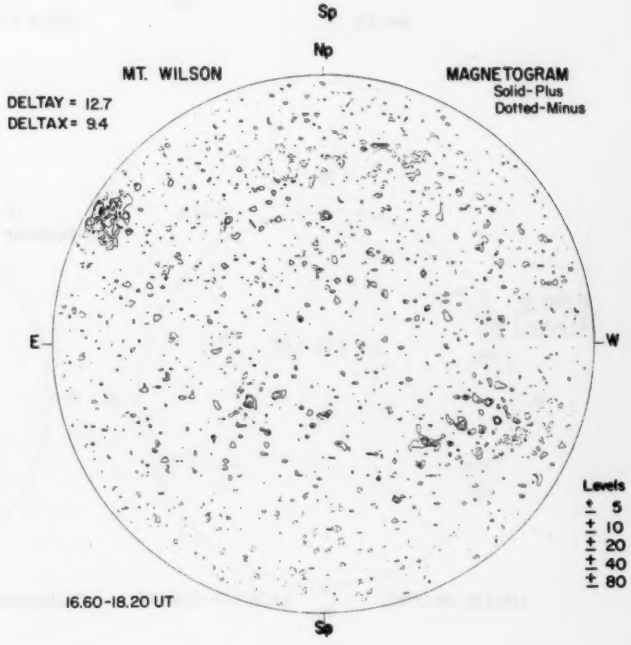
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

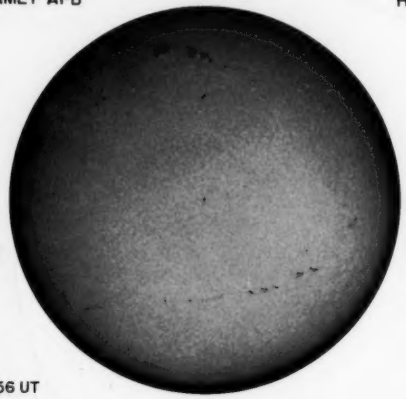
DELTAY = 12.7
DELTAX = 9.4

MAGNETOGRAM
Solid - Plus
Dotted - Minus




16.60-18.20 UT

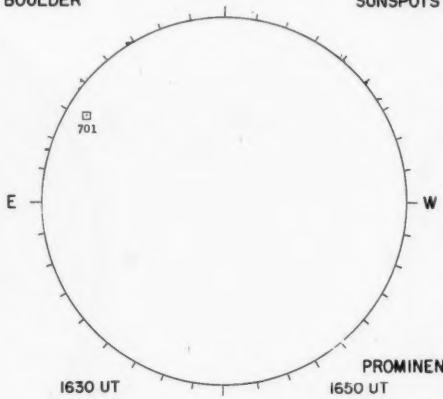
RAMEY AFB




Hα

1156 UT

BOULDER



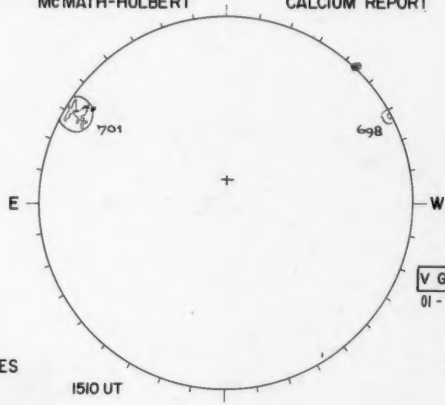

SUNSPOTS

1630 UT

PROMINENCES

1650 UT

McMATH-HULBERT



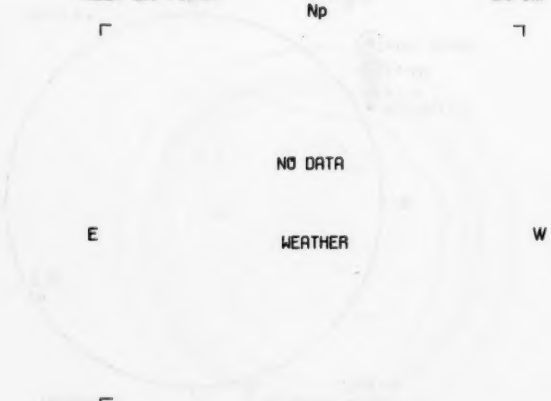

CALCIUM REPORT

V GOOD M
01 - 2400 - 3.0

1510 UT

NELC LA POSTA

2.0 CM

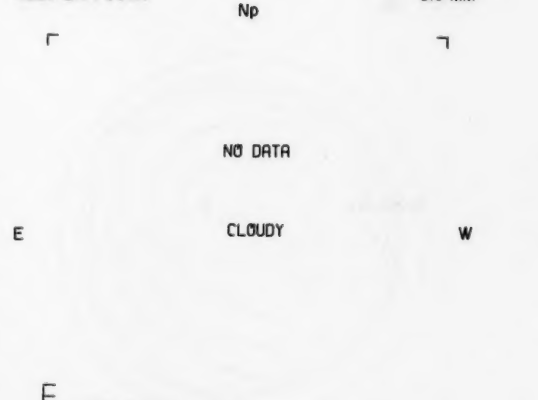



1956 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM



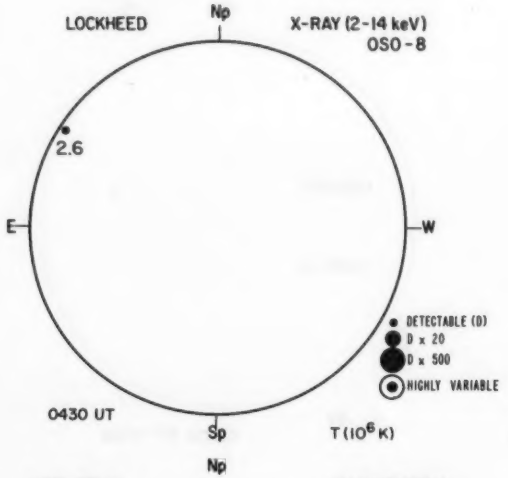

2037 UT

Ant. Temp. Unit 100°K

# MARCH 27, 1977 (P=-25.90, $B_o$=-6.78, $L_o$=318.29)

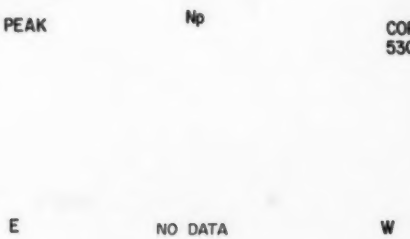
LOCKHEED

X-RAY (2-14 keV)
OSO-8



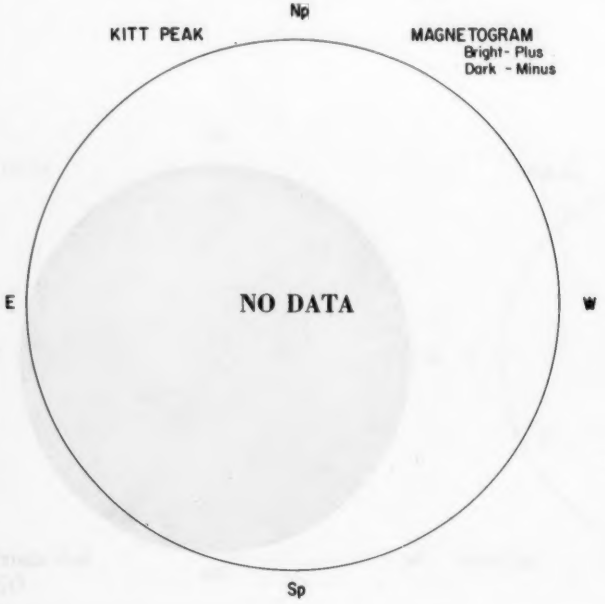

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

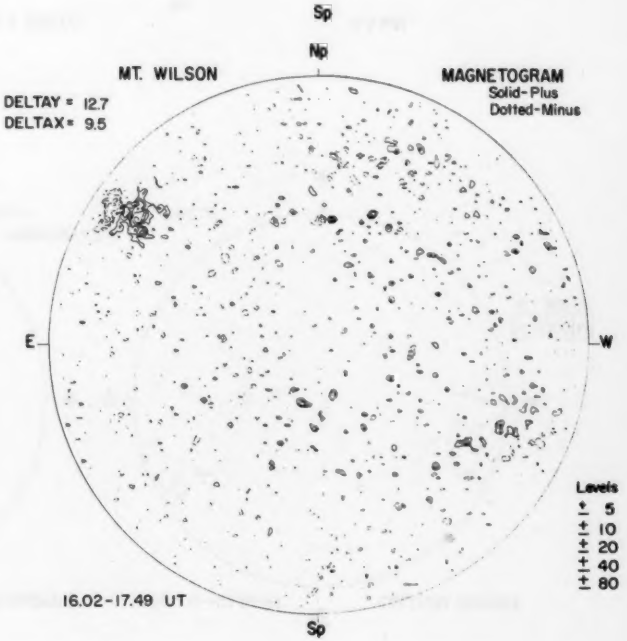
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.7
DELTAX = 9.5



Sp

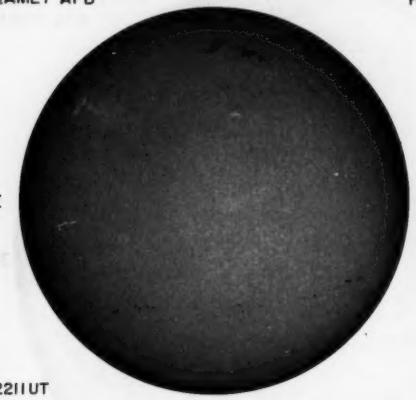
Sp

27

RAMEY AFB

Np

Hα



E

W

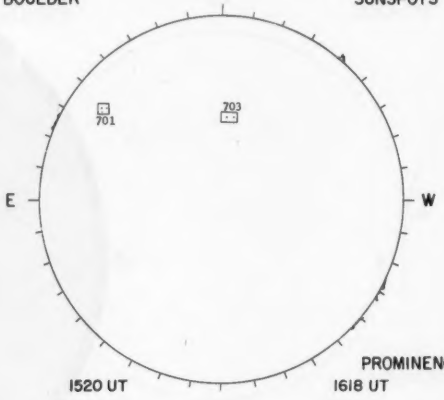
2211 UT

Sp

BOULDER

Np

SUNSPOTS




E

W

1520 UT

Sp

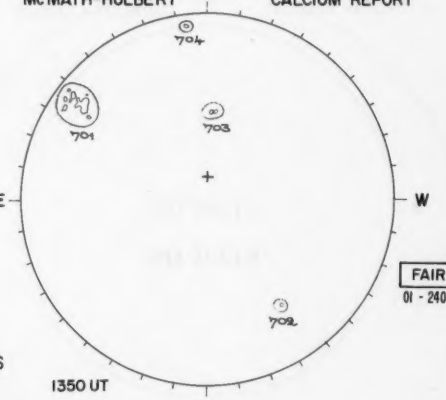
PROMINENCES

1618 UT

McMATH-HULBERT

Np

CALCIUM REPORT




E

W

FAIR | S

01 - 2400 - 30

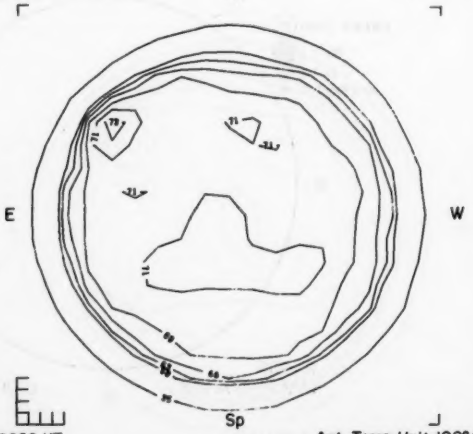
1350 UT

Sp

NELC LA POSTA

2.0 CM

Np




E

W

Sp

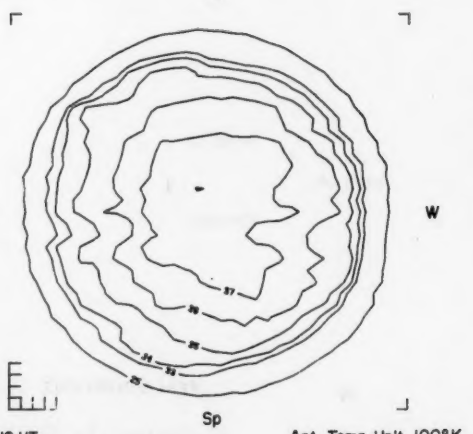
2226 UT

Ant. Temp. Unit 100° K

NELC LA POSTA

8.6 MM

Np




E

W

Sp

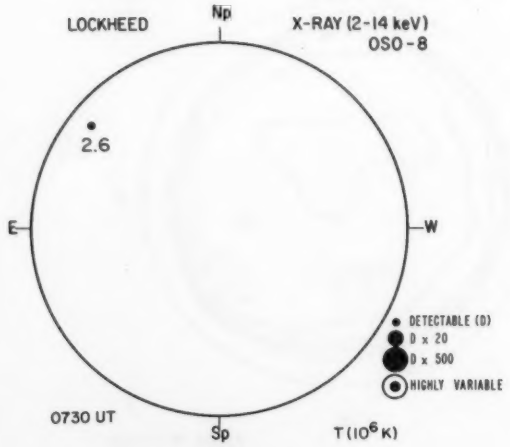
2310 UT

Ant. Temp. Unit 100° K

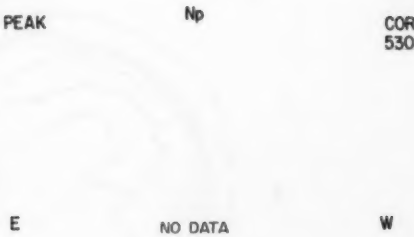
87
Mar 77

# MARCH 28, 1977 (P =-25.97, $B_o$ =-6.73, $L_o$ = 305.10)

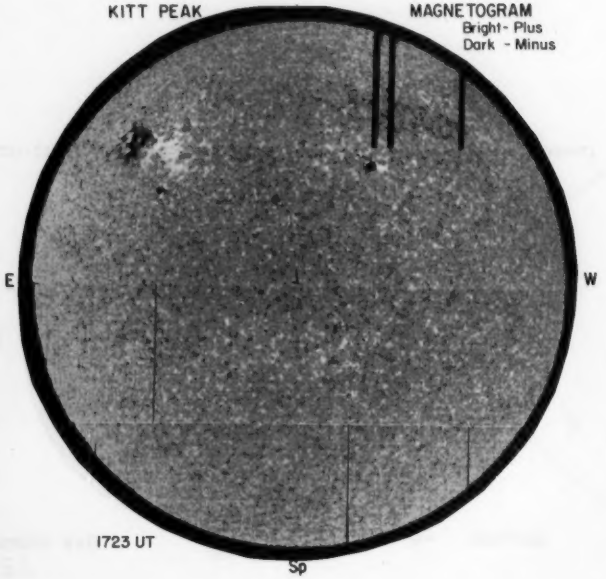
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

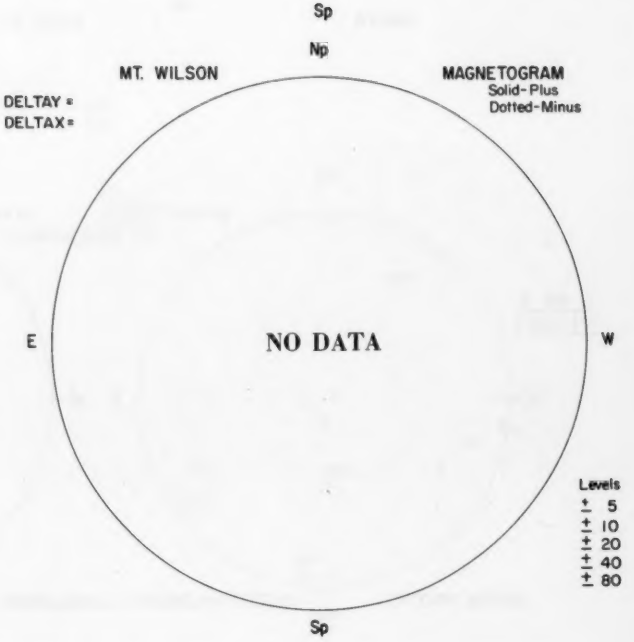



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



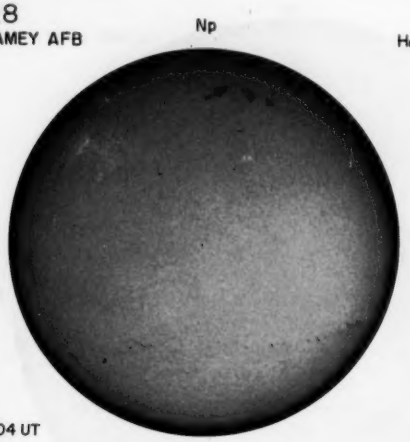

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =



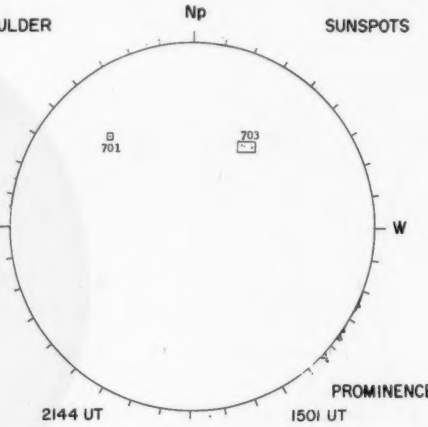
28

RAMEY AFB




1204 UT

Hα BOULDER



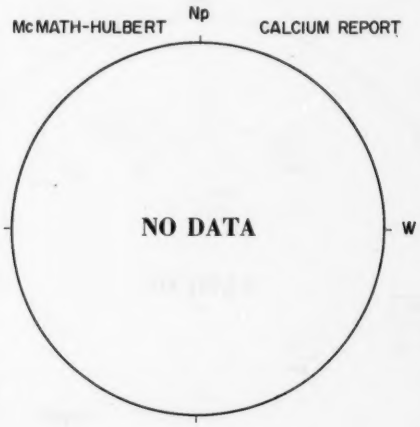

2144 UT

SUNSPOTS

PROMINENCES

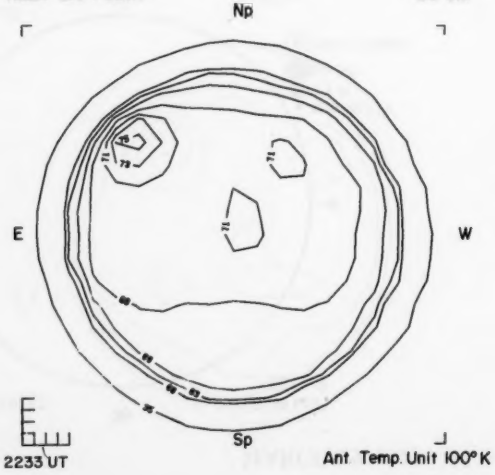
1501 UT

McMATH-HULBERT




CALCIUM REPORT

NELC LA POSTA 2.0 CM




2233 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

NO DATA

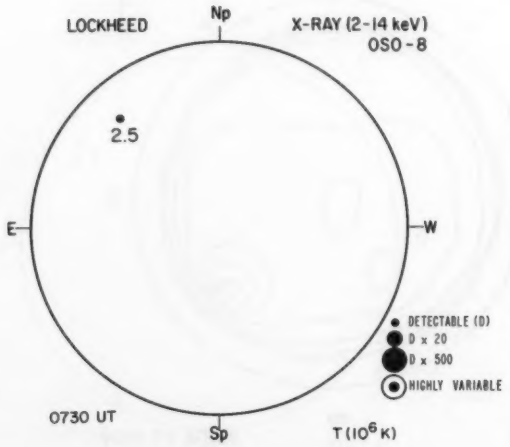
WEATHER

---- UT

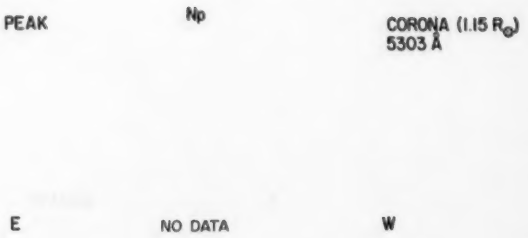
Ant. Temp. Unit 100°K

# MARCH 29, 1977 (P=-26.04, $B_0$=-6.68, $L_0$=291.91)

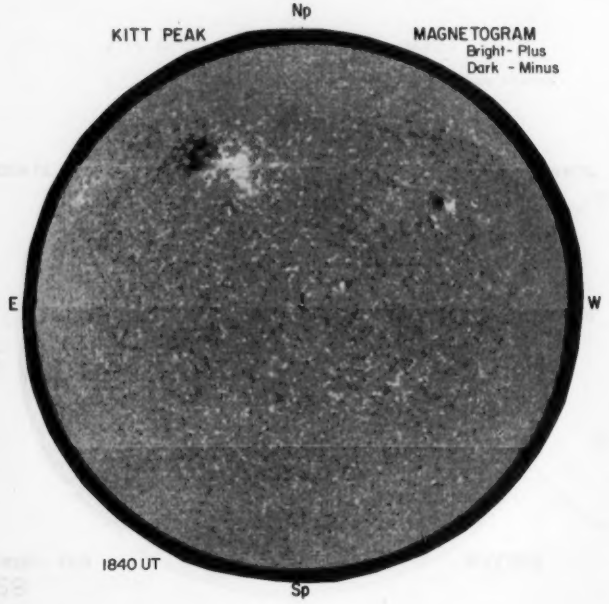
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

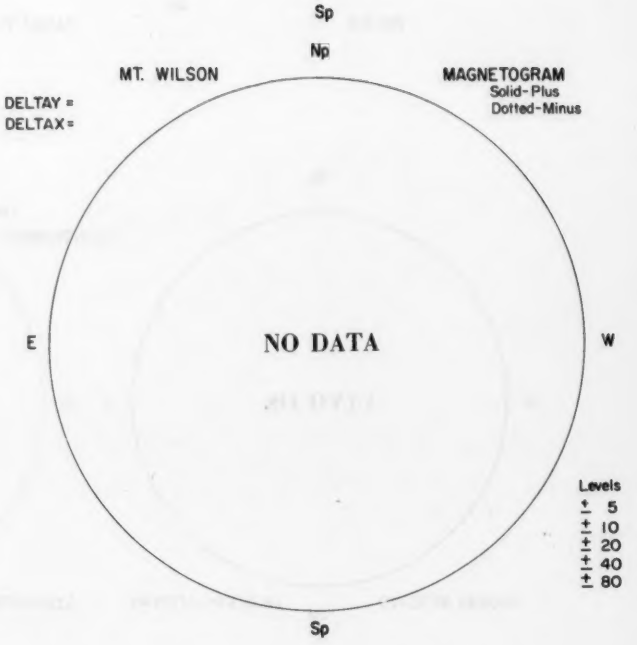



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



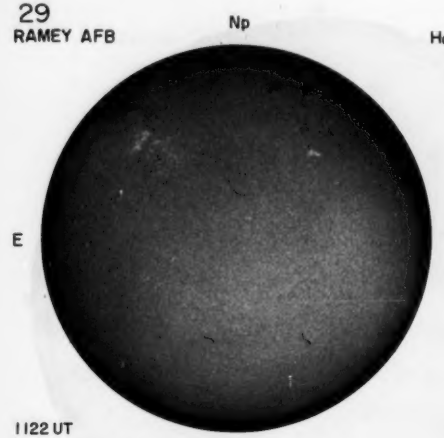

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =



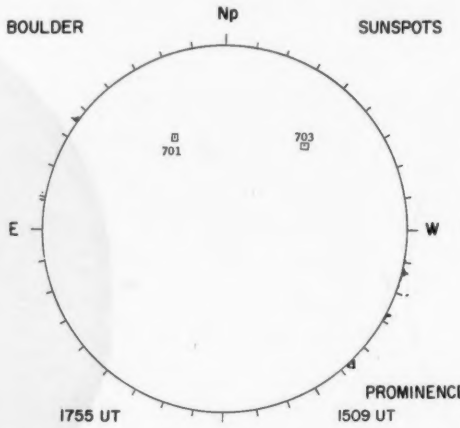
29

RAMEY AFB




1122 UT

Hα BOULDER



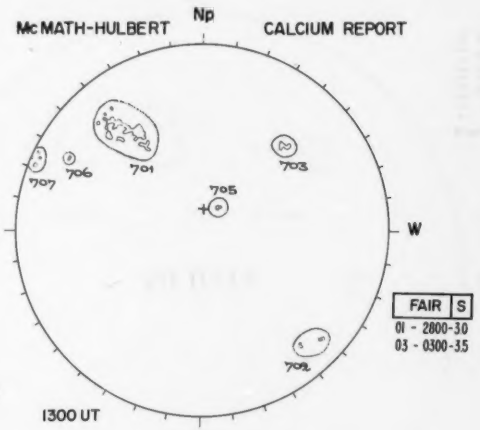

1755 UT

SUNSPOTS

PROMINENCES

1509 UT

McMATH-HULBERT




1300 UT

CALCIUM REPORT

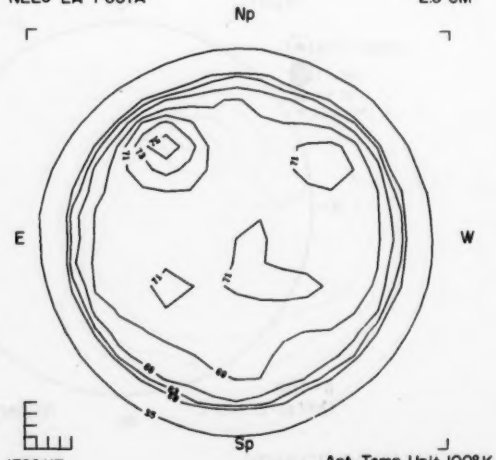
FAIR | S

01 - 2800-30

03 - 0300-35

NELC LA POSTA

2.0 CM

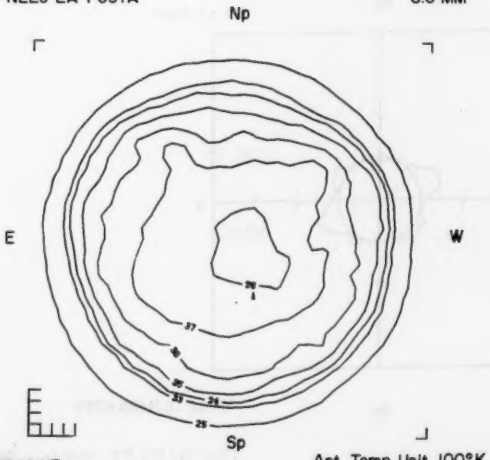



1706 UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM




1746 UT

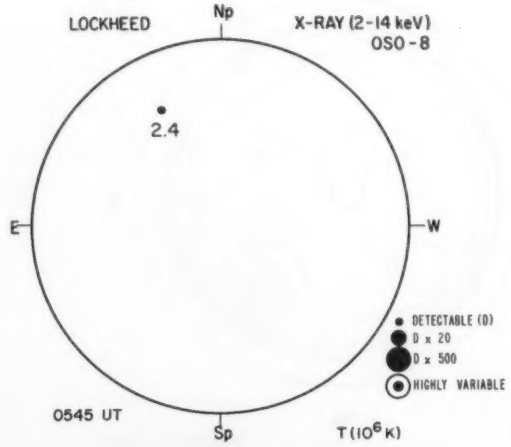
Ant. Temp. Unit 100°K

91

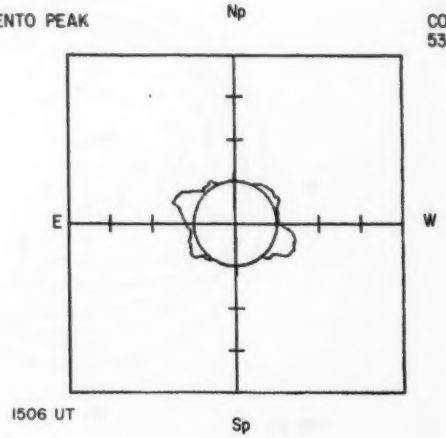
Mar 77

# MARCH 30, 1977 (P =-26.10, $B_0$ =-6.63, $L_0$ =278.72)

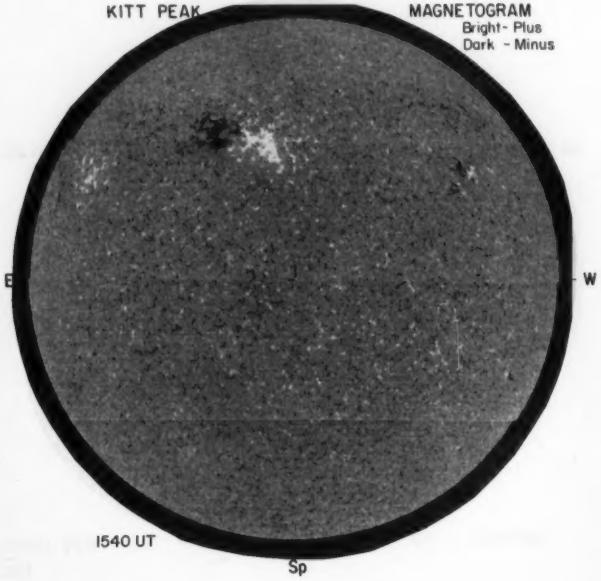
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

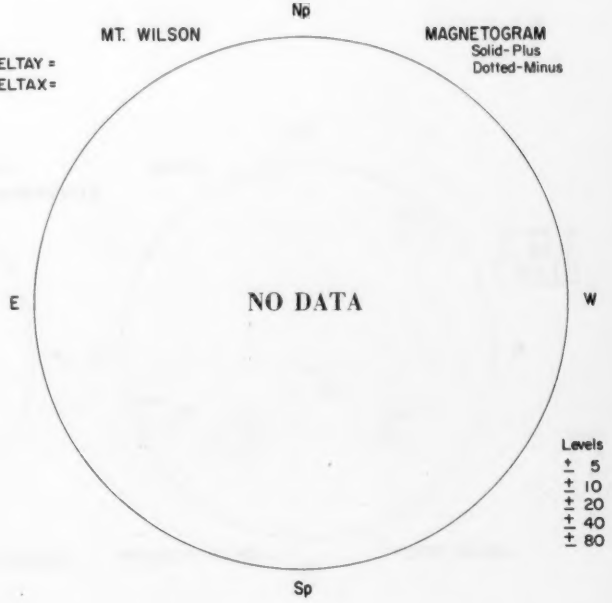



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



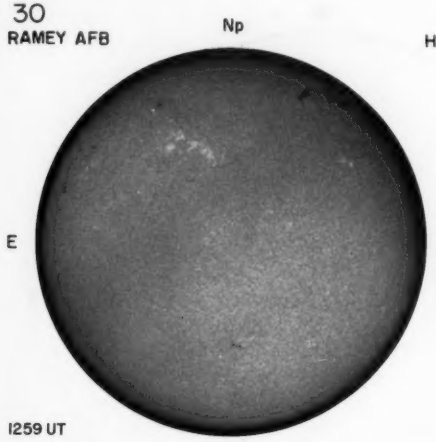

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =



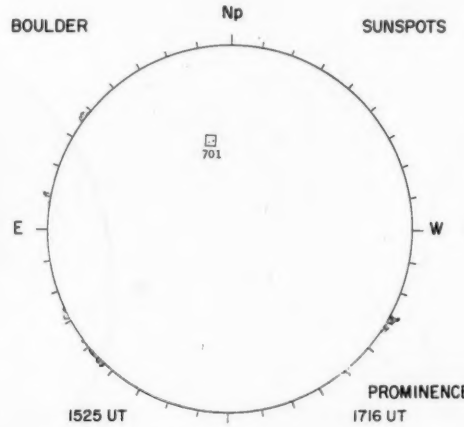
30

RAMEY AFB




1259 UT

Hα BOULDER




1525 UT

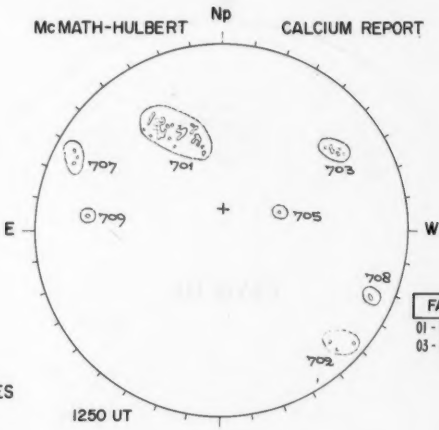
SUNSPOTS

PROMINENCES

1716 UT

McMATH-HULBERT

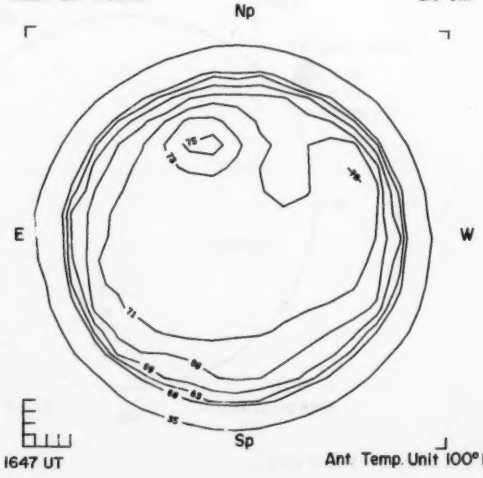
CALCIUM REPORT




1250 UT

| FAIR | S |
|---|---|
| 01 - 2500 - 30 | |
| 03 - 0400 - 30 | |

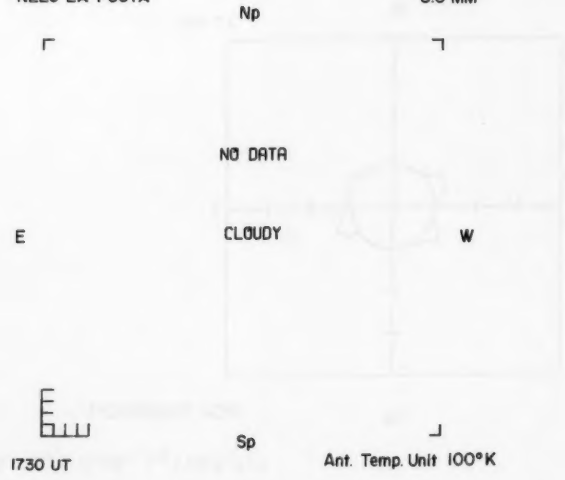
NELC LA POSTA 2.0 CM




1647 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM



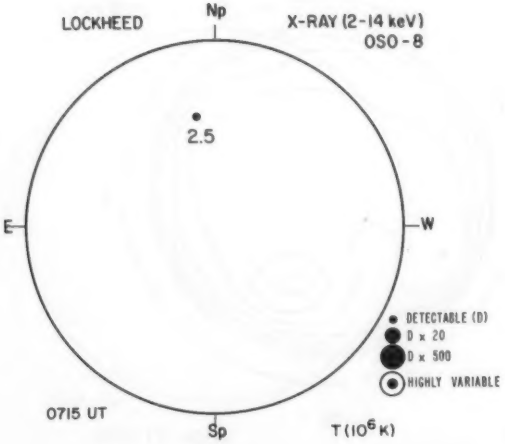

1730 UT

Ant. Temp. Unit 100°K

93
Mar 77

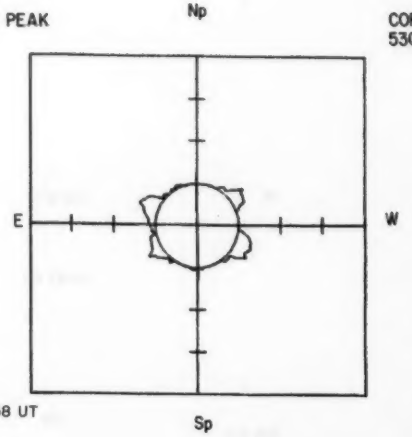
MARCH 31, 1977 (P=-26.16, $B_0$=-6.58, $L_0$=265.52)

LOCKHEED X-RAY (2-14 keV) OSO-8



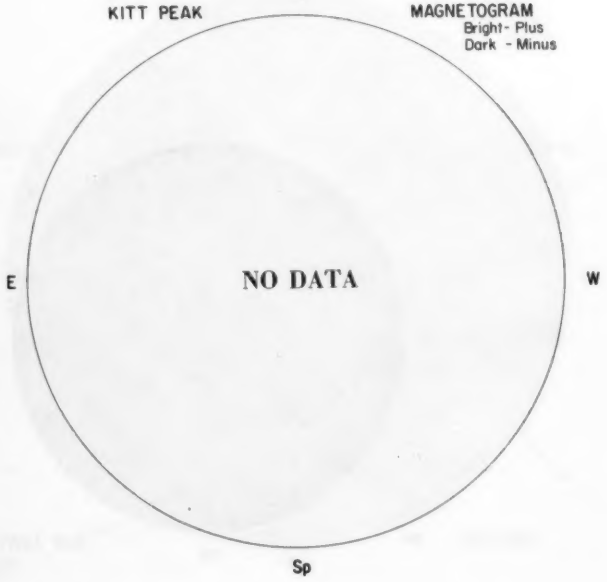

0715 UT T($10^6$K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



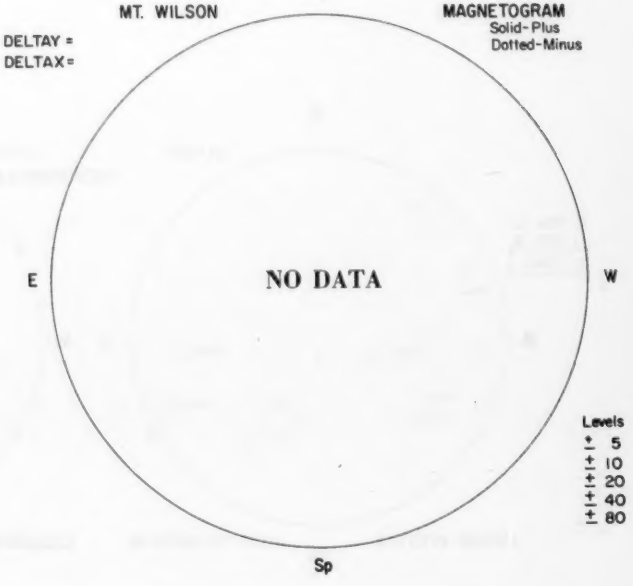

1958 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



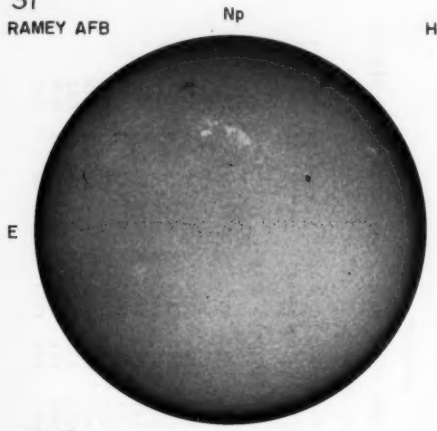

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



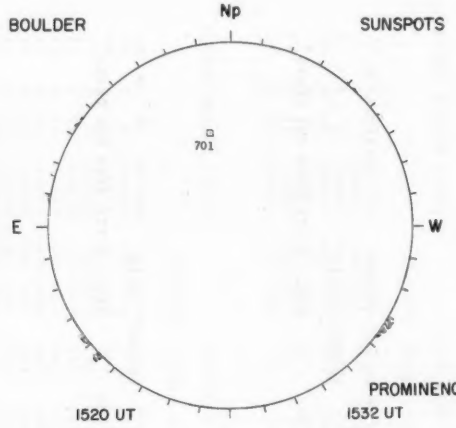
31

RAMEY AFB




1300 UT

Hα BOULDER



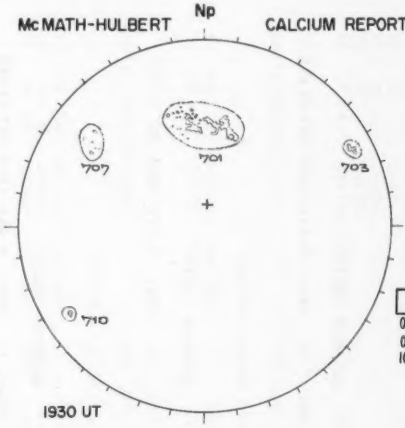

1520 UT

SUNSPOTS

PROMINENCES

1532 UT

McMATH-HULBERT



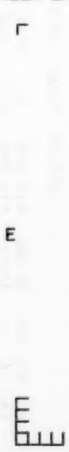

1930 UT

CALCIUM REPORT

| GOOD | M |
|---|---|
| 01 - 2000 - 3.0 | |
| 03 - 0400 - 2.5 | |
| 10 - 0200 - 2.5 | |

NELC LA POSTA

2.0 CM




NO DATA

WEATHER

---- UT

Ant. Temp. Unit 100°K

NELC LA POSTA

8.6 MM

NO DATA

WEATHER

---- UT

Ant. Temp. Unit 100°K

95
Mar 77

# REGIONS OF SOLAR ACTIVITY

## MARCH 1977

MCMATH REGION 14670 CMP DATE 2.6

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 2 | 28 | 14670 | S25 E26 | 279 | 200 | 1.5 | | | | | | | | | |

MCMATH REGION 14671 CMP DATE 3.2

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 2 | 28 | 14671 | S15 E33 | 272 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14672 CMP DATE 3.6

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 2 | 28 | 14672 | S03 E39 | 266 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14677 CMP DATE 3.9

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 3 | 14677 | N26 E04 | 261 | 300 | 2.0 | 19763 | N26 E00 | 265 | (AP) | 3 | R | 10 | 2 | AXX |
| 77 | 3 | 7 | 14677 | N26 W52 | 263 | 200 | 1.5 | | | | | | | | | |
| 77 | 3 | 8 | 14677 | N26 W63 | 263 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14666 CMP DATE 4.5 RETURN OF REGION 14630* ROTATION 2

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 2 | 25 | 14666 | N28 E90 | 253 | 200 | 1.0 | | | | | | | | | |
| 77 | 2 | 26 | 14666 | N27 E78 | 254 | 100 | 1.0 | | | | | | | | | |
| 77 | 2 | 27 | 14666 | N27 E62 | 254 | 500 | 1.0 | | | | | | | | | |
| 77 | 2 | 28 | 14666 | N27 E50 | 255 | 400 | 1.5 | | | | | | | | | |

MCMATH REGION 14667 CMP DATE 4.8

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 2 | 25 | 14667 | S33 E89 | 254 | 100 | 1.0 | | | | | | | | | |
| 77 | 2 | 26 | 14667 | S34 E78 | 254 | 200 | 1.5 | | | | | | | | | |
| 77 | 2 | 27 | 14667 | S33 E65 | 251 | 200 | 1.0 | | | | | | | | | |
| 77 | 2 | 28 | 14667 | S33 E55 | 250 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14676 CMP DATE 5.9

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 2 | 14676 | S11 E44 | 235 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14674 CMP DATE 8.4 RETURN OF REGION 14647 ROTATION 2

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 1 | 14674 | N15 E88 | 205 | 100 | 1.0 | | | | | | | | | |
| 77 | 3 | 2 | 14674 | N17 E76 | 203 | 1200 | 2.5 | 19762 | N17 E78 | 199 | (AF) | 4 | M | 40 | 1 | HSX |
| 77 | 3 | 3 | 14674 | N16 E63 | 202 | 1500 | 2.5 | 19762 | N17 E65 | 200 | (AF) | 4 | R | 70 | 1 | HSX |
| 77 | 3 | 4 | 14674 | | | | 0.0 | | N17 E51 | 201 | (AF) | 4 | M | 20 | 1 | HSX |
| 77 | 3 | 5 | 14674 | | | | 0.0 | | N17 E38 | 201 | (AF) | 4 | R | 40 | 3 | HSX |
| 77 | 3 | 6 | 14674 | | | | 0.0 | | N17 E24 | 201 | (AF) | 5 | B | 40 | 1 | HSX |
| 77 | 3 | 7 | 14674 | N17 E09 | 202 | 2000 | 3.5 | 19762 | N17 E12 | 200 | (AF) | 5 | B | 20 | 1 | HSX |
| 77 | 3 | 8 | 14674 | N19 W03 | 203 | 2500 | 3.5 | 19762 | N17 W03 | 201 | (AF) | 4 | B | 40 | 1 | HRX |
| 77 | 3 | | 14674 | | | | 0.0 | | N22 E00 | 198 | (BF) | 3 | B | 50 | 9 | CRI |
| 77 | 3 | 9 | 14674 | N19 W17 | 203 | 2500 | 3.5 | 19762 | N17 W15 | 201 | (AF) | 4 | B | 20 | 1 | HSX |
| 77 | 3 | | 14674 | | | | 0.0 | | N22 W13 | 199 | (BF) | 5 | B | 30 | 3 | CSO |

# REGIONS OF SOLAR ACTIVITY

## MARCH 1977

MCMATH REGION 14674 (CONT) CMP DATE 8.4 RETURN OF REGION 14647 ROTATION 2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 10 | 14674 | N19 W30 | 204 | 2500 | 3.5 | 19762 | N17 W23 | 201 | (AF) | 3 | M | 20 | 1 | HRX |
| 77 | 3 | | 14674 | | | | 0.0 | | N22 W24 | 197 | (AF) | 3 | M | 40 | 4 | CRO |
| 77 | 3 | 11 | 14674 | N19 W43 | 204 | 2500 | 3.0 | 19762 | N18 W41 | 201 | (AF) | 3 | M | 20 | 1 | HRX |
| 77 | 3 | | 14674 | | | | 0.0 | | N22 W37 | 197 | (AF) | 4 | M | 50 | 3 | CAO |
| 77 | 3 | 12 | 14674 | | | | 0.0 | | N18 W54 | 200 | (AF) | 2 | | | | |
| 77 | 3 | | 14674 | | | | 0.0 | | N22 W50 | 196 | (AF) | 4 | B | 30 | 1 | AXX |
| 77 | 3 | 13 | 14674 | N20 W70 | 204 | 1800 | 2.5 | 19764 | N22 W62 | 195 | (AF) | 3 | B | 20 | 1 | AXX |

MCMATH REGION 14678 CMP DATE 11.1

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 7 | 14678 | N38 E45 | 166 | 100 | 2.5 | | | | | | | | | |

MCMATH REGION 14682 CMP DATE 12.0

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 9 | 14682 | S29 E30 | 156 | 200 | 1.0 | | | | | | | | | |
| 77 | 3 | 10 | 14682 | S29 E18 | 156 | 100 | 2.5 | | | | | | | | | |

MCMATH REGION 14681 CMP DATE 12.3 RETURN OF REGION 14643* ROTATION 2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 7 | 14681 | N04 E65 | 146 | 200 | 1.0 | | | | | | | | | |
| 77 | 3 | 8 | 14681 | N04 E51 | 149 | 300 | 1.0 | | | | | | | | | |
| 77 | 3 | 9 | 14681 | N04 E37 | 149 | 200 | 1.0 | | | | | | | | | |
| 77 | 3 | 10 | 14681 | N04 E23 | 151 | 300 | 1.5 | | | | | | | | | |
| 77 | 3 | 11 | 14681 | N04 E09 | 152 | 300 | 1.0 | | | | | | | | | |
| 77 | 3 | 13 | 14681 | N04 W18 | 152 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14679 CMP DATE 12.9 RETURN OF REGION 14649 ROTATION 2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 7 | 14679 | N24 E70 | 141 | 1200 | 3.0 | | | | | | | | | |
| 77 | 3 | 8 | 14679 | N24 E60 | 140 | 2000 | 3.0 | | | | | | | | | |
| 77 | 3 | 9 | 14679 | N24 E46 | 140 | 2300 | 3.0 | | | | | | | | | |
| 77 | 3 | 10 | 14679 | N24 E33 | 141 | 2000 | 3.0 | | | | | | | | | |
| 77 | 3 | 11 | 14679 | N24 E18 | 143 | 2200 | 3.5 | | | | | | | | | |
| 77 | 3 | 13 | 14679 | N24 W09 | 143 | 1900 | 3.0 | | | | | | | | | |
| 77 | 3 | 15 | 14679 | N24 W35 | 143 | 1900 | 3.0 | | | | | | | | | |
| 77 | 3 | 16 | 14679 | N24 W47 | 142 | 1700 | 2.5 | | | | | | | | | |
| 77 | 3 | 17 | 14679 | N24 W60 | 141 | 1200 | 2.0 | | | | | | | | | |
| 77 | 3 | 19 | 14679 | N25 W85 | 139 | 500 | 1.0 | | | | | | | | | |

MCMATH REGION 14680 CMP DATE 14.3 RETURN OF REGION 14637 ROTATION 2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 7 | 14680 | S43 E76 | 135 | 1400 | 2.5 | | | | | | | | | |
| 77 | 3 | 8 | 14680 | S43 E70 | 130 | 1800 | 3.0 | | | | | | | | | |
| 77 | 3 | 9 | 14680 | S43 E60 | 126 | 1800 | 3.0 | | | | | | | | | |
| 77 | 3 | 10 | 14680 | S43 E44 | 130 | 2000 | 3.0 | | | | | | | | | |
| 77 | 3 | 11 | 14680 | S43 E30 | 131 | 2000 | 3.0 | | | | | | | | | |
| 77 | 3 | 13 | 14680 | S43 E16 | 124 | 2000 | 3.0 | | | | | | | | | |
| 77 | 3 | 15 | 14680 | S43 W15 | 123 | 1600 | 2.5 | | | | | | | | | |
| 77 | 3 | 16 | 14680 | S44 W22 | 117 | 1700 | 2.5 | | | | | | | | | |
| 77 | 3 | 17 | 14680 | S44 W35 | 116 | 1500 | 2.5 | | | | | | | | | |
| 77 | 3 | 19 | 14680 | S44 W59 | 113 | 900 | 2.0 | | | | | | | | | |
| 77 | 3 | 20 | 14680 | S44 W71 | 109 | 800 | 2.0 | | | | | | | | | |
| 77 | 3 | 21 | 14680 | S44 W80 | 109 | 800 | 1.5 | | | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## MARCH 1977

MCMATH REGION 14683 CMP DATE 15.0

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 9 | 14683 | S10 E70 | 116 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14684 CMP DATE 15.8

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 9 | 14684 | S33 E86 | 100 | 600 | 3.5 | | | | | | | | | |
| 77 | 3 | 10 | 14684 | S32 E69 | 105 | 600 | 3.5 | | | | | | | | | |
| 77 | 3 | 11 | 14684 | S32 E57 | 104 | 400 | 3.0 | | | | | | | | | |
| 77 | 3 | 13 | 14684 | S32 E30 | 104 | 200 | 1.5 | | | | | | | | | |

MCMATH REGION 14687 CMP DATE 16.8

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 16 | | | | | | | S17 W03 | | | H | | 0 | 1 | AXX |
| 77 | 3 | 17 | 14687 | S19 W10 | 91 | 200 | 2.0 | | | | | | | | | |
| 77 | 3 | 19 | 14687 | S20 W36 | 90 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14685 CMP DATE 18.6

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 13 | 14685 | S03 E66 | 68 | 300 | 1.5 | | | | | | | | | |

MCMATH REGION 14686 CMP DATE 19.7 RETURN OF REGION 14651 ROTATION 3

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 13 | 14686 | S22 E85 | 49 | 1000 | 2.0 | | | | | | | | | |
| 77 | 3 | 15 | 14686 | S21 E55 | 53 | 700 | 3.0 | | S20 E51 | | | B | | 0 | 1 | AXX |
| 77 | 3 | 16 | 14686 | S21 E42 | 53 | 700 | 2.5 | | | | | | | | | |
| 77 | 3 | 17 | 14686 | S21 E29 | 52 | 500 | 2.5 | | | | | | | | | |
| 77 | 3 | 19 | 14686 | S21 E01 | 53 | 500 | 2.0 | | | | | | | | | |
| 77 | 3 | 20 | 14686 | S21 W15 | 53 | 500 | 2.0 | | | | | | | | | |
| 77 | 3 | 21 | 14686 | S23 W26 | 55 | 400 | 2.0 | | | | | | | | | |
| 77 | 3 | 22 | 14686 | S21 W39 | 52 | 400 | 1.5 | | | | | | | | | |
| 77 | 3 | 23 | 14686 | S21 W52 | 54 | 400 | 1.5 | | | | | | | | | |
| 77 | 3 | 24 | 14686 | S21 W64 | 55 | 400 | 1.0 | | | | | | | | | |
| 77 | 3 | 25 | 14686 | S22 W77 | 55 | 400 | 1.0 | | | | | | | | | |

MCMATH REGION 14697 CMP DATE 19.8

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 21 | 14697 | S29 W24 | 53 | 200 | 2.5 | 19765 | S30 W23 | 51 | ( B) | 3 | H | 20 | 3 | BXO |
| 77 | 3 | 22 | 14697 | S28 W34 | 47 | 300 | 2.0 | 19765 | S30 W36 | 50 | ( B) | 5 | B | 40 | 3 | DRO |
| 77 | 3 | 23 | 14697 | S30 W48 | 50 | 500 | 2.5 | 19765 | S29 W50 | 51 | (BP) | 3 | B | 20 | 4 | CRO |
| 77 | 3 | 24 | 14697 | S29 W61 | 52 | 700 | 3.0 | | S30 W55 | | | | H | 20 | 1 | AXX |
| 77 | 3 | 25 | 14697 | S29 W74 | 52 | 700 | 2.0 | | | | | | | | | |

MCMATH REGION 14688 CMP DATE 20.2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 19 | 14688 | N19 E08 | 46 | 100 | 1.5 | | | | | | | | | |
| 77 | 3 | 20 | 14688 | N18 W09 | 47 | 100 | 1.0 | | | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## MARCH 1977

MCMATH REGION 14698 CMP DATE 20.5

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 22 | 14698 | N28 W29 | 42 | 100 | 1.5 | | | | | | | | |
| 77 | 3 | 23 | 14698 | N26 W42 | 44 | 200 | 1.5 | | | | | | | | |
| 77 | 3 | 24 | 14698 | N27 W55 | 46 | 400 | 3.0 | | | | | | | | |
| 77 | 3 | 25 | 14698 | N27 W68 | 46 | 300 | 2.5 | | | | | | | | |
| 77 | 3 | 26 | 14698 | N27 W82 | 45 | 100 | 1.0 | | | | | | | | |

MCMATH REGION 14690 CMP DATE 22.6

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 19 | 14690 | S14 E41 | 13 | 100 | 1.5 | | | | | | | | |
| 77 | 3 | 20 | 14690 | S14 E23 | 15 | 100 | 1.5 | | | | | | | | |

MCMATH REGION 14689 CMP DATE 23.8

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 19 | 14689 | N15 E55 | 0 | 100 | 2.0 | | | | | | | | |
| 77 | 3 | 20 | 14689 | N15 E38 | 0 | 200 | 1.0 | | | | | | | | |

MCMATH REGION 14702 CMP DATE 25.0

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 27 | 14702 | S42 W34 | 344 | 100 | 1.0 | | | | | | | | |
| 77 | 3 | 29 | 14702 | S42 W55 | 339 | 300 | 1.0 | | | | | | | | |
| 77 | 3 | 30 | 14702 | S42 W65 | 336 | 300 | 1.0 | | | | | | | | |

MCMATH REGION 14695 CMP DATE 25.2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 21 | 14695 | S12 E47 | 343 | 100 | 2.0 | | | | | | | | |

MCMATH REGION 14708 CMP DATE 25.8

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 30 | 14708 | S24 W63 | 334 | 200 | 2.0 | | | | | | | | |

MCMATH REGION 14699 CMP DATE 27.4

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 23 | 14699 | S05 E51 | 312 | 100 | 2.0 | | | | | | | | |

MCMATH REGION 14703 CMP DATE 27.4

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT CLASS |
| 77 | 3 | 27 | 14703 | N22 W02 | 312 | 200 | 1.5 | 19767 | N21 W04 | 313 | (BP) | 2 | 8 | 10 | 2 BXO |
| 77 | 3 | 28 | 14703 | | | | 0.0 | | N21 W15 | 311 | ( B) | 3 | 8 | 20 | 3 CRO |
| 77 | 3 | 29 | 14703 | N22 W29 | 313 | 300 | 3.5 | 19767 | N21 W27 | 310 | AF | 2 | 8 | 20 | 2 AXX |
| 77 | 3 | 30 | 14703 | N21 W41 | 312 | 400 | 3.0 | | | | | | | | |
| 77 | 3 | 31 | 14703 | N21 W58 | 313 | 400 | 2.5 | | | | | | | | |
| 77 | 4 | 01 | 14703 | N21 W71 | | 300 | 0 2. | 0 | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## MARCH 1977

MCMATH REGION 14696 CMP DATE 28.1

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 21 | 14696 | S17 E85 | 305 | 200 | 1.5 | | | | | | | | | |
| 77 | 3 | 22 | 14696 | S15 E73 | 301 | 300 | 2.5 | | | | | | | | | |
| 77 | 3 | 23 | 14696 | S16 E60 | 303 | 300 | 2.0 | | | | | | | | | |
| 77 | 3 | 24 | 14696 | S16 E47 | 304 | 300 | 2.5 | | | | | | | | | |
| 77 | 3 | 25 | 14696 | S17 E34 | 304 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14700 CMP DATE 28.5

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 23 | 14700 | N24 E65 | 298 | 100 | 1.0 | | | | | | | | | |
| 77 | 3 | 24 | 14700 | N24 E52 | 299 | 100 | 1.5 | | | | | | | | | |
| 77 | 3 | 25 | 14700 | N23 E39 | 299 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14704 CMP DATE 28.8

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 27 | 14704 | N01 E16 | 294 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14705 CMP DATE 29.2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 29 | 14705 | N01 W04 | 288 | 100 | 2.0 | | | | | | | | | |
| 77 | 3 | 30 | 14705 | N01 W18 | 289 | 100 | 2.0 | | | | | | | | | |

MCMATH REGION 14701 CMP DATE 31.7

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 3 | 25 | 14701 | N27 E80 | 258 | 1000 | 2.0 | | N24 E70 | | | | B | 10 | 1 | AXX |
| 77 | 3 | 26 | 14701 | N26 E67 | 256 | 2400 | 3.0 | 19766 | N27 E61 | 262 | ( B) | 2 | B | 10 | 1 | AXX |
| 77 | 3 | 27 | 14701 | N26 E52 | 256 | 2400 | 3.0 | 19766 | N26 E45 | 264 | (BP) | 3 | B | 20 | 3 | BXO |
| 77 | 3 | 28 | 14701 | | | | 0.0 | | N25 E34 | 262 | (AP | 1 | B | 10 | 1 | AXX |
| 77 | 3 | 29 | 14701 | N26 E30 | 254 | 2800 | 3.0 | | N23 E17 | | | | B | 10 | 2 | AXX |
| 77 | 3 | 30 | 14701 | N26 E17 | 254 | 2500 | 3.0 | | N22 E07 | | | | B | 10 | 2 | AXX |
| 77 | 3 | 31 | 14701 | N26 W01 | 256 | 2000 | 3.0 | 19768 | N24 E07 | 250 | AF | 3 | R | 10 | 2 | BXO |
| 77 | 4 | 01 | 14701 | N26 W15 | | 2000 | 2.5 | | | | | | B | 10 | 2 | B |
| 77 | 4 | 02 | 14701 | N26 W29 | | 2100 | 2.5 | 19768 | N24 W22 | | (BF) | 2 | B | 40 | 9 | C |
| 77 | 4 | 03 | 14701 | N26 W37 | | 2000 | 3.0 | 19768 | N25 W35 | | (B ) | 4 | B | 20 | 3 | B |
| 77 | 4 | 04 | 14701 | N26 W49 | | 1600 | 3.0 | | | | | | B | 10 | 1 | A |
| 77 | 4 | 05 | 14701 | N27 W63 | | 2000 | 2.5 | | | | | | | | | |
| 77 | 4 | 06 | 14701 | N27 W74 | | 1500 | 2.5 | | | | | | | | | |
| 77 | 4 | 07 | 14701 | N26 W89 | | 700 | 2.0 | | | | | | | | | |

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on March 4, 5, 6, 12, 14, 18 and 28, 1977. No sunspot observations were made at Mt. Wilson on March 24, 25 and 30, 1977.

# DAILY CALCIUM PLAGE INDEX

## MARCH 1977

| YR | MO | DAY | INDEX | YR | MO | DAY | INDEX | YR | MO | DAY | INDEX |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 | 3 | 1 | 0.9 | 77 | 3 | 11 | 16.4 | 77 | 3 | 21 | 1.3 |
| 77 | 3 | 2 | 1.4 | 77 | 3 | 12 | * | 77 | 3 | 22 | 1.2 |
| 77 | 3 | 3 | 2.7 | 77 | 3 | 13 | 11.5 | 77 | 3 | 23 | 1.7 |
| 77 | 3 | 4 | * | 77 | 3 | 14 | * | 77 | 3 | 24 | 2.2 |
| 77 | 3 | 5 | * | 77 | 3 | 15 | 8.1 | 77 | 3 | 25 | 1.0 |
| 77 | 3 | 6 | * | 77 | 3 | 16 | 6.6 | 77 | 3 | 26 | 2.4 |
| 77 | 3 | 7 | 8.7 | 77 | 3 | 17 | 4.6 | 77 | 3 | 27 | 4.3 |
| 77 | 3 | 8 | 12.5 | 77 | 3 | 18 | * | 77 | 3 | 28 | * |
| 77 | 3 | 9 | 14.0 | 77 | 3 | 19 | 2.0 | 77 | 3 | 29 | 7.8 |
| 77 | 3 | 10 | 16.0 | 77 | 3 | 20 | 1.6 | 77 | 3 | 30 | 7.9 |
| | | | | | | | | 77 | 3 | 31 | 6.4 |

* NO OBSERVATIONS

# SUDDEN IONOSPHERIC DISTURBANCES

## MARCH 1977

| DAY | UNIVERSAL TIME START | END | MAX | IMP | WIDE SPREAD INDEX | NUMBER OF STATION REPORTS BY TYPE SWF | SCNA | SEA | SPA | LF-SPA | SES | SFD | KNOWN FLARE | McMATH REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 08 | 2219 | 2306 | 2236 | 1- | 1 | | | | 1 | | | | 2219E | 14674 |
| 09 | 0948 | 1008 | 0951 | 1- | 1 | 1 | | | | | | | 0952 | 14674 |
| 09 | 1942 | 2050 | 1946 | 1- | 1 | 1 | | | | | | | * | |
| 21 | 1945 | 1958 | 1946 | 1 | 1 | | 1 | | | | | | * | |

PERIODS OF NO OBSERVATIONS:

| DATE | TIME (UT) and STATION |
|---|---|
| 01-15 | 0000-2400 A36 |
| 01-06 | 0000-2400 A41 |
| 06 | 0721-0842 UM (13 kHz) |
| 08 | 2026-2045 TM |
| 09-11 | 1100-2400 UM (13 kHz), 1100-2400 UM (10 kHz) |
| 10-18 | 0000-2400 A28 |
| 11 | 0650-0754 TM |
| 13 | 0000-2400 TN |
| 16-17 | 0000-2400 A30 |
| 18 | 2016-2106 UM (13 kHz) |
| 20-22 | 1010-1335 UM (10 kHz), 1015-1335 UM (13 kHz) |
| 22 | 1639-2139 UM (10 kHz) |
| 23 | 0515-0644 UM (10 kHz), 1954-2117 UM (10 kHz) |
| 24 | 0050-0243 UM (10 kHz), 1944-2123 UM (10 kHz) |
| 25 | 0000-0055 UM (10 kHz), 1944-2045 UM (10 kHz), 2013-2128 UM (13 kHz), 2236-2400 UM (10 kHz) |
| 26-31 | 0000-2400 A41 |
| 26 | 0000-0117 UM (10 kHz), 1946-2135 UM (10 kHz) |
| 27-31 | 0000-2400 A32 |
| 27 | 0000-2400 A30, 1948-2100 UM (10 kHz), 2233-2350 UM (10 kHz) |
| 28-31 | 0000-2400 A36 |
| 29 | 0000-2400 A1, 1953-2116 UM (10 kHz) |
| 30-31 | 0000-2400 A29 |
| 30 | 0500-0613 UM (10 kHz), 1929-2033 UM (10 kHz), 2235-2320 Um (10 kHz) |

STATIONS REPORTING FOR MARCH 1977

AAVSO (A1, A19, A21, A28, A29, A30. A31, A34, A35, A36, A37, A40, A41) (SES)
(A1, A26, A31, A32) (SEA) (A31) (SWF)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA)
HUANCAYO (HU) (SWF)
INIBO (IN) (SPA)
MCMATH (MC) (SWF, SCNA)
PANSKA VES (PU) (SWF, SEA, SES)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
UPICE (UI) (SEA)

## SID's BY McMATH REGION

### MARCH 1977

| DAY | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REGION 74 | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | |
| X-RAY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UNKNOWN | | | | | | | | | 1 | | | | | | | | | | | | 1 | | | | | | | | | | |
| NO FP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

MARCH 1977

| MAR 1977 | TIMES OF OBSERVATION START UT | TIMES OF OBSERVATION END UT | STATION | EVENTS DECIMETRIC BAND START UT | DECIMETRIC BAND END UT | DECIMETRIC BAND INT | METRIC BAND START UT | METRIC BAND END UT | METRIC BAND INT | DEKAMETRIC BAND START UT | DEKAMETRIC BAND END UT | DEKAMETRIC BAND INT | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 0000 | 0739 | CULG | | | | | | | | | | |
| | 0000 | 0952 | MANI | | | | | | | | | | |
| | 0639 | 1629 | WEIS | | | | | | | | | | |
| | 1123 | 2229 | SGMR | | | | | | | | | | |
| | 1346 | 2345 | HARV | | | | | | | | | | |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| | 2213 | 2400 | MANI | | | | | | | | | | |
| 02 | 0000 | 0952 | MANI | | | | | | | | | | |
| | 0000 | 0744 | CULG | | | | | | | | | | |
| | 0632 | 1650 | DURN | | | | | | | | | | |
| | 0750 | 0915 | WEIS | | | | | | | | | | |
| | 1022 | 1630 | WEIS | | | | | | | | | | |
| | 1121 | 2230 | SGMR | | | | | | | | | | |
| | 1346 | 2345 | HARV | | | | | | | | | | |
| | 2045 | 2400 | CULG | 2121.5 | 2122 | 1 | 2121.5 | 2222 | 1 | | | | IIIG,U |
| | 2212 | 2400 | MANI | | | | | | | | | | |
| | | | CULG | | | | 2302 | 2305 | | | | | IIIG,W |
| | | | CULG | | | | 2355.5 | | 1 | | | | IIIB |
| 03 | 0000 | 0952 | MANI | | | | | | | | | | |
| | 0000 | 0744 | CULG | | | | 0226.5 | 0228 | | | | | IIIGG,W |
| | 0630 | 1652 | DURN | | | | | | | | | | |
| | 0842 | 1324 | WEIS | | | | | | | | | | |
| | 1121 | 2231 | SGMR | | | | | | | | | | |
| | 1346 | 2345 | HARV | | | | | | | | | | |
| | 2211 | 2400 | MANI | | | | | | | | | | |
| | 2044 | 2400 | CULG | | | | 2338.5 | 2340.5 | | | | | IIIG,W |
| 04 | 0000 | 0744 | CULG | | | | | | | | | | |
| | 0000 | 0952 | MANI | | | | | | | | | | |
| | 0627 | 1657 | DURN | | | | | | | | | | |
| | 0819 | 0831 | WEIS | | | | | | | | | | |
| | 1118 | 2233 | SGMR | | | | | | | | | | |
| | 1345 | 2345 | HARV | | | | | | | | | | |
| | 2044 | 2400 | CULG | | | | | | | | | | |
| | 2211 | 2400 | MANI | | | | | | | | | | |
| 05 | 0000 | 0953 | MANI | | | | | | | | | | |
| | 0000 | 0720 | CULG | 0327 | 0327.5 | 1 | 0327 | 0327.5 | 1 | | | | IIIG |
| | 0625 | 1700 | DURN | | | | | | | | | | |
| | 0730 | 0743 | CULG | | | | | | | | | | |
| | 1116 | 2234 | SGMR | | | | | | | | | | |
| | 1327 | 2345 | HARV | | | | | | | | | | |
| | 2044 | 2400 | CULG | | | | | | | | | | |
| | 2211 | 2400 | MANI | | | | | | | | | | |
| 06 | 0000 | 0953 | MANI | | | | | | | | | | |
| | 0622 | 1657 | DURN | | | | | | | | | | |
| | 0000 | 0743 | CULG | | | | 0710.5 | 0711.5 | 1 | | | | IIIG |
| | 1115 | 2235 | SGMR | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 2044 | 2400 | CULG | | | | | | | | | | |
| | 2211 | 2400 | MANI | | | | | | | | | | |
| 07 | 0000 | 0952 | MANI | | | | | | | | | | |
| | 0000 | 0743 | CULG | | | | | | | | | | |
| | 0621 | 1704 | DURN | | | | 0636.7 | 0636.8 | 2 | | | | IIIG |
| | 1114 | 2236 | SGMR | | | | | | | | | | |
| | 1330 | 2345 | HARV | | | | | | | | | | |
| | 2044 | 2400 | CULG | | | | | | | | | | |
| | 2209 | 2400 | MANI | | | | | | | | | | |
| 08 | 0000 | 0952 | MANI | | | | | | | | | | |
| | 0000 | 0743 | CULG | | | | 0440 | | | | | | IIIB,W |
| | 0618 | 0806 | DURN | | | | | | | | | | |
| | 0834 | 1354 | WEIS | | | | | | | | | | |
| | 0946 | 1704 | DURN | | | | | | | | | | |
| | 1112 | 2237 | SGMR | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | | | | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

MARCH 1977

| MAR 1977 | TIMES OF OBSERVATION START UT | TIMES OF OBSERVATION END UT | STATION | EVENTS DECIMETRIC BAND START UT | DECIMETRIC BAND END UT | DECIMETRIC BAND INT | METRIC BAND START UT | METRIC BAND END UT | METRIC BAND INT | DEKAMETRIC BAND START UT | DEKAMETRIC BAND END UT | DEKAMETRIC BAND INT | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 08 | 2209 | 2400 | MANI | | | | | | | | | | |
| | 2043 | 2400 | CULG | 2214 | 2315 | 1 | 2214 | 2315 | 1 | | | | IS |
| | | | CULG | | | | 2222 | 2305 | 1 | | | | IIIS |
| | | | CULG | 2315 | 2400 | 1 | 2315 | 2400 | 1 | | | | IS,W |
| 09 | 0000 | 0743 | CULG | 0000 | 0300 | | 0000 | 0300 | | | | | IS,W |
| | 0000 | 0952 | MANI | | | | | | | | | | |
| | | | CULG | 0120 | 0130 | 1 | | | | | | | IS |
| | | | CULG | | | | 0122.5 | 0123 | 1 | | | | IIIG |
| | | | CULG | 0237.5 | 0238 | | 0237.5 | 0239 | | | | | IIIG,W |
| | | | CULG | | | | 0255 | 0505 | 1 | | | | IIIN |
| | | | CULG | 0300 | 0743 | 1 | 0300 | 0743 | 1 | | | | IS |
| | | | CULG | | | | 0505 | 0743 | 2 | | | | IIIS |
| | 0616 | 1705 | DURN | 0616 E | 1705 D | 2 | 0616 E | 1705 D | 2 | | | | IC,N |
| | | | DURN | 0731.2 | 0731.2 | 1 | 0731.2 | 0731.2 | 1 | | | | III |
| | | | DURN | 0821.8 | 0821.9 | 2 | 0821.8 | 0821.9 | 2 | | | | IIIG |
| | | | DURN | 0953.9 | 0953.9 | 1 | 0953.9 | 0953.9 | 1 | | | | III |
| | 1003 | 1336 | WEIS | | | | 1020.8 | 1021.6 | 2 | | | | IIIG |
| | | | WEIS | | | | 1111.8 | 1125.8 | 2 | | | | IIIGG |
| | 1111 | 2239 | SGMR | | | | | | | | | | |
| | | | DURN | 1119.6 | 1119.6 | 1 | 1119.6 | 1119.6 | 1 | | | | III |
| | | | DURN | 1122.3 | 1122.4 | 2 | 1122.3 | 1122.4 | 2 | | | | IIIG |
| | | | WEIS | | | | 1157.5 | 1157.8 | 2 | | | | IIIG |
| | | | WEIS | | | | 1223.9 | 1224.2 | 1 | | | | IIIG |
| | | | DURN | 1311.8 | 1312.4 | 2 | 1311.8 | 1312.4 | 3 | | | | IIIG |
| | | | WEIS | | | | 1311.9 | 1313.4 | 2 | | | | IIIG |
| | | | WEIS | | | | 1317.8 | 1318.0 | 1 | | | | IIIG |
| | 1505 | 1641 | WEIS | | | | | | | | | | |
| | 1330 | 2345 | HARV | | | | 1916 | 1917 | 2 | 1916 | 1917 | 2 | UNCL |
| | 2209 | 2400 | MANI | | | | | | | | | | |
| | 2043 | 2400 | CULG | 2330 | 2350 | | 2043 | 2350 | | | | | IS,W |
| 10 | 0000 | 0727 | CULG | | | | | | | | | | |
| | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0613 | 1707 | DURN | 1102.0 | 1105.2 | 1 | 1102.0 | 1105.2 | 1 | | | | IIIGG |
| | 0725 | 1643 | WEIS | | | | 1102.1 | 1102.6 | 2 | | | | IIIG |
| | 1108 | 2240 | SGMR | | | | | | | | | | |
| | | | DURN | 1110.8 | 1110.9 | 2 | | | | | | | IIIG,RS |
| | 1149 | 1507 | DWIN | | | | 1149 | 1320 | 1 | | | | IC,S |
| | | | WEIS | | | | 1158.8 | 1159.7 | 1 | | | | IIIG |
| | | | WEIS | | | | 1249.4 | 1249.5 | 2 | | | | IIIG |
| | | | WEIS | | | | 1251.9 | 1252.5 | 2 | | | | IIIG |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 2043 | 2400 | CULG | | | | | | | | | | |
| | 2208 | 2400 | MANI | | | | | | | | | | |
| 11 | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0000 | 0742 | CULG | | | | 0114.5 | | 1 | | | | IIIB |
| | | | CULG | | | | 0122.5 | 0127.5 | | | | | IIIG,W |
| | | | CULG | | | | 0250.5 | 0258 | | | | | IIIGG,W |
| | | | CULG | | | | 0442.5 | | 1 | | | | IIIB |
| | | | CULG | | | | 0510 | 0742 | | | | | IS,W |
| | 0608 | 1708 | DURN | | | | | | | | | | |
| | | | CULG | | | | 0639.5 | 0640 | 1 | | | | IIIG |
| | 0620 | 1522 | WEIS | | | | 0639.8 | 0640.1 | 1 | | | | IIIG |
| | | | CULG | | | | 0740 | 0742 | 1 | | | | IIIG |
| | 1106 | 2241 | SGMR | | | | | | | | | | |
| | | | WEIS | | | | 1131.3 | 1131.5 | 1 | | | | IIIG |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 1528 | 1644 | WEIS | | | | | | | | | | |
| | 2042 | 2400 | CULG | | | | | | | | | | |
| | 2207 | 2400 | MANI | | | | | | | | | | |
| 12 | 0000 | 0734 | CULG | | | | 0226.5 | 0236 | 2 | | | | II, H |
| | 0000 | 0955 | MANI | | | | | | | 0228.0 | 0234.0 | 3 | IIIG |
| | | | CULG | | | | 0336 | | | | | | IIIB,W |
| | 0605 | 1016 | DURN | | | | | | | | | | |
| | 1105 | 2242 | SGMR | | | | | | | | | | |
| | 0618 | 1645 | WEIS | | | | 1119.0 | 1119.7 | 2 | | | | IIIG |
| | | | WEIS | | | | 1122.6 | 1122.7 | 2 | | | | IIIG |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | | | WEIS | | | | 1129.6 | 1129.8 | 1 | | | | IIIB |
| | 1152 | 1712 | DURN | 1222.9 | 1222.9 | 1 | 1222.9 | 1222.9 | 1 | | | | III |
| | | | DURN | | | | 1236.2 | 1236.3 | 1 | | | | IIIG |
| | 1330 | 2345 | HARV | | | | | | | | | | |
| | 2043 | 2400 | CULG | | | | 2104 | | | | | | IIIB,W |
| | 2207 | 2400 | MANI | | | | | | | | | | |
| | | | CULG | | | | 2224 | | | | | | IIIB,W |
| | | | CULG | | | | 2321.5 | 2322 | 1 | | | | IIIG |
| 13 | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0000 | 0740 | CULG | | | | 0022.5 | | | | | | IIIB,W |
| | 0603 | 1712 | DURN | | | | | | | | | | |
| | 0616 | 1500 | WEIS | | | | 0842.3 | 0842.8 | 2 | | | | IIIB |
| | | | WEIS | | | | 0844.0 | 0844.2 | 1 | | | | IIIB |
| | 1103 | 2243 | SGMR | | | | | | | | | | |
| | 1526 | 1647 | WEIS | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | 1908 | 1911 | 1 | 1908 | 1911 | 1 | IIIG |
| | 2205 | 2400 | MANI | | | | | | | | | | |
| | 2042 | 2400 | CULG | | | | 2226.5 | 2227 | 1 | | | | IIIG |
| 14 | 0000 | 0741 | CULG | | | | | | | | | | |
| | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0602 | 1712 | DURN | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 0644 | 1547 | WEIS | | | | 1340.6 | 1341.4 | 2 | | | | IIIG |
| | 1101 | 2245 | SGMR | | | | | | | 1340.8 | 1341.6 | 1 | III |
| | 2205 | 2400 | MANI | | | | | | | | | | |
| | 2042 | 2400 | CULG | | | | 2336.5 | 2346 | | | | | IIIGG,W |
| 15 | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0000 | 0721 | CULG | | | | 0541 | 0542.5 | 1 | | | | IIIG,U |
| | 0600 | 1713 | DURN | | | | | | | | | | |
| | 0718 | 1607 | WEIS | | | | | | | | | | |
| | 1059 | 2246 | SGMR | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2205 | 2400 | MANI | | | | | | | | | | |
| 16 | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0559 | 1713 | DURN | | | | | | | | | | |
| | 0000 | 0741 | CULG | 0620.5 | 0621 | 1 | 0620.5 | 0621 | 2 | | | | IIIG |
| | 0730 | 1652 | WEIS | | | | | | | | | | |
| | 1059 | 2247 | SGMR | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | 1803 | 1805 | 1 | 1803 | 1805 | 1 | IIIG |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2205 | 2400 | MANI | | | | | | | | | | |
| 17 | 0000 | 0955 | MANI | | | | | | | | | | |
| | 0000 | 0740 | CULG | | | | | | | | | | |
| | 0608 | 1653 | WEIS | | | | | | | | | | |
| | 0611 | 1714 | DURN | | | | | | | | | | |
| | 1056 | 2248 | SGMR | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2205 | 2400 | MANI | | | | | | | | | | |
| 18 | 0000 | 0958 | MANI | | | | | | | | | | |
| | 0000 | 0740 | CULG | | | | | | | | | | |
| | 0559 | 1715 | DURN | | | | | | | | | | |
| | 0605 | 0624 | WEIS | | | | | | | | | | |
| | 0731 | 1655 | WEIS | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | 1630 | | 1 | 1630 | | 1 | IIIG |
| | 1054 | 2249 | SGMR | | | | | | | 2000.3 | 2000.6 | 1 | III |
| | | | HARV | | | | 2000 | | 3 | 2000 | | 3 | IIIB,V |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2315 | 2400 | MANI | | | | | | | | | | |
| 19 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0000 | 0740 | CULG | | | | | | | | | | |
| | 0559 | 1715 | DURN | | | | | | | | | | |

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# SPECTRAL OBSERVATIONS

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| MAR 1977 | TIMES OF OBSERVATION START UT | TIMES OF OBSERVATION END UT | STATION | EVENTS DECIMETRIC BAND START UT | DECIMETRIC BAND END UT | DECIMETRIC BAND INT | METRIC BAND START UT | METRIC BAND END UT | METRIC BAND INT | DEKAMETRIC BAND START UT | DEKAMETRIC BAND END UT | DEKAMETRIC BAND INT | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 0603 | 1640 | WEIS | | | | | | | | | | |
| | 1052 | 2250 | SGMR | | | | | | | | | | |
| | 1331 | 2345 | HARV | | | | | | | | | | |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2204 | 2400 | MANI | | | | | | | | | | |
| 20 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0000 | 0740 | CULG | | | | | | | | | | |
| | 0559 | 1716 | DURN | | | | | | | | | | |
| | 0601 | 1658 | WEIS | | | | | | | | | | |
| | 1051 | 2252 | SGMR | | | | | | | | | | |
| | 1313 | 2345 | HARV | | | | | | | | | | |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2202 | 2400 | MANI | | | | | | | | | | |
| 21 | 0000 | 0739 | CULG | | | | | | | | | | |
| | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0559 | 1718 | DURN | | | | | | | | | | |
| | 0600 | 1304 | WEIS | | | | | | | | | | |
| | 1049 | 2253 | SGMR | | | | | | | | | | |
| | 1313 | 2345 | HARV | | | | | | | | | | |
| | 1346 | 1525 | WEIS | | | | | | | | | | |
| | 1540 | 1659 | WEIS | | | | | | | | | | |
| | 2040 | 2400 | CULG | | | | | | | | | | |
| | 2202 | 2400 | MANI | | | | | | | | | | |
| 22 | 0000 | 1000 | MANI | | | | | | | | | | |
| | 0000 | 0739 | CULG | | | | | | | | | | |
| | 0557 | 1700 | WEIS | | | | | | | | | | |
| | 0559 | 0847 | DURN | | | | | | | | | | |
| | 1047 | 2254 | SGMR | | | | | | | | | | |
| | 1315 | 2345 | HARV | | | | | | | | | | |
| | 1507 | 1725 | DURN | | | | | | | | | | |
| | 2039 | 2400 | CULG | | | | | | | | | | |
| | 2202 | 2400 | MANI | | | | | | | | | | |
| 23 | 0000 | 0300 | MANI | | | | | | | | | | |
| | 0000 | 0739 | CULG | | | | | | | | | | |
| | 0000 | 0437 | MANI | | | | | | | 0255.2 | 0304.3 | 2 | IIIG |
| | 0315 | 1001 | MANI | | | | | | | | | | |
| | 0553 | 1305 | WEIS | | | | | | | | | | |
| | 0554 | 1729 | DURN | | | | | | | | | | |
| | 1045 | 2205 | SGMR | | | | | | | | | | |
| | 1307 | 1704 | WEIS | | | | | | | | | | |
| | 1315 | 2345 | HARV | | | | | | | | | | |
| | 2039 | 2400 | CULG | | | | | | | | | | |
| | 2202 | 2400 | MANI | | | | | | | | | | |
| 24 | 0000 | 1003 | MANI | | | | | | | | | | |
| | 0000 | 0738 | CULG | | | | | | | | | | |
| | 0544 | 1730 | DURN | | | | | | | | | | |
| | 0551 | 1705 | WEIS | | | | 0951.1 | 0951.3 | 1 | | | | IIIG |
| | 1044 | 2256 | SGMR | | | | | | | | | | |
| | 1315 | 2345 | HARV | | | | | | | | | | |
| | 2039 | 2400 | CULG | | | | 2132.5 | | 1 | | | | IIIB,U |
| | | | CULG | | | | 2134 | | 1 | | | | IIIB,U |
| | 2202 | 2400 | MANI | | | | | | | | | | |
| 25 | 0452 | 1003 | MANI | | | | | | | | | | |
| | 0000 | 0737 | CULG | | | | 0538 | 0539 | | | | | IIIG,W |
| | | | CULG | | | | 0734.5 | 0735.5 | 1 | | | | IIIG |
| | 0549 | 1003 | WEIS | | | | 0734.9 | 0734.3 | 1 | | | | IIIG |
| | | | WEIS | | | | 0736.3 | 0738.7 | 1 | | | | IIIG |
| | 1005 | 1707 | WEIS | | | | 1236.4 | 1237.2 | 1 | | | | IIIG |
| | 1042 | 2257 | SGMR | | | | | | | 1336.5 | 1340.7 | 2 | IIIG |
| | | | WEIS | | | | 1425.2 | 1425.3 | 1 | | | | IIIB |
| | | | WEIS | | | | 1435.9 | 1436.0 | 3 | | | | IIIG |
| | 1315 | 2345 | HARV | | | | 1437 | 1440 | 1 | 1439 | 1440 | 1 | IIIG |
| | | | WEIS | | | | 1439.1 | 1440.9 | 3 | | | | IIIG |
| | 0542 | 1732 | DURN | 1439.3 | 1439.4 | 1 | | | | | | | IIIG |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

MARCH 1977

| MAR 1977 | TIMES OF OBSERVATION START UT | TIMES OF OBSERVATION END UT | STATION | EVENTS DECIMETRIC BAND START UT | DECIMETRIC BAND END UT | DECIMETRIC BAND INT | METRIC BAND START UT | METRIC BAND END UT | METRIC BAND INT | DEKAMETRIC BAND START UT | DEKAMETRIC BAND END UT | DEKAMETRIC BAND INT | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | | | WEIS | | | | 1521.1 | 1521.3 | 1 | | | | IIIG |
| | | | HARV | | | | 1739 | | 1 | 1739 | | 1 | IIIG |
| | | | HARV | | | | 1744 | | 2 | 1744 | | 2 | IIIB |
| | 2039 | 2400 | CULG | | | | 2115 | 2118 | | | | | IIIG,W |
| | 2200 | 2400 | MANI | | | | | | | | | | |
| 26 | 0000 | 1003 | MANI | | | | | | | | | | |
| | 0000 | 0737 | CULG | | | | | | | | | | |
| | 0538 | 1736 | DURN | | | | | | | | | | |
| | 0546 | 1708 | WEIS | | | | | | | | | | |
| | 1040 | 2258 | SGMR | | | | | | | | | | |
| | 1316 | 2345 | HARV | | | | 1846 | | 1 | 1846 | | 1 | IIIB,W |
| | 2038 | 2400 | CULG | | | | | | | | | | |
| | 2200 | 2400 | MANI | | | | | | | | | | |
| 27 | 0000 | 1003 | MANI | | | | | | | | | | |
| | 0000 | 0737 | CULG | | | | 0049.5 | | | | | | IIIB,W |
| | | | CULG | 0156.5 | 0158 | 2 | 0150.5 | 0201 | 2 | | | | IIIGG |
| | | | CULG | | | | 0235 | 0237 | 2 | 0235.5 | 0236 | 1 | IIIGG |
| | | | CULG | | | | 0333 | 0335 | 1 | | | | I |
| | | | CULG | | | | 0419 | 0420 | 1 | | | | IIIG |
| | | | CULG | | | | 0422.5 | 0430 | 1 | | | | IIIGG |
| | 0537 | 0946 | DURN | | | | | | | | | | |
| | 0545 | 0746 | WEIS | | | | 0616.4 | 0617.6 | 1 | | | | IIIG |
| | | | CULG | | | | 0616 | 0623 | 1 | | | | IIIGG |
| | | | WEIS | | | | 0618.9 | 0621.3 | 3 | | | | IIIGG |
| | 1001 | 1736 | DURN | | | | | | | | | | |
| | 1038 | 2300 | SGMR | | | | | | | | | | |
| | 1140 | 1709 | WEIS | | | | 1153.9 | 1154.2 | 1 | | | | IIIG |
| | | | WEIS | | | | 1212.4 | 1212.7 | 1 | | | | IIIG |
| | 1315 | 2345 | HARV | | | | | | | | | | |
| | 2038 | 2400 | CULG | | | | | | | | | | |
| | 2159 | 2400 | MANI | | | | | | | | | | |
| 28 | 0000 | 0232 | MANI | | | | | | | | | | |
| | 0000 | 0737 | CULG | | | | | | | | | | |
| | 0440 | 1005 | MANI | | | | | | | | | | |
| | 0536 | 1738 | DURN | | | | | | | | | | |
| | 1037 | 2301 | SGMR | | | | | | | | | | |
| | 0543 | 1709 | WEIS | | | | 1627.3 | 1628.7 | 3 | | | | IIIG |
| | 1316 | 2345 | HARV | | | | 1627 | 1628 | 3 | 1627 | 1628 | 3 | IIIG,V |
| | 2158 | 2400 | MANI | | | | | | | | | | |
| | 2037 | 2400 | CULG | | | | 2318 | | | | | | IIIB,W |
| 29 | 0000 | 0516 | MANI | | | | | | | | | | |
| | 0000 | 0739 | CULG | | | | 0212 | 0213 | 1 | | | | IIIG |
| | 0534 | 1738 | DURN | | | | | | | | | | |
| | 0544 | 0835 | WEIS | | | | | | | | | | |
| | 0650 | 1005 | MANI | | | | | | | | | | |
| | 0849 | 1711 | WEIS | | | | | | | | | | |
| | 1035 | 2302 | SGMR | | | | | | | | | | |
| | 1315 | 2345 | HARV | | | | | | | | | | |
| | 2036 | 2400 | CULG | | | | | | | | | | |
| | 2157 | 2400 | MANI | | | | | | | | | | |
| 30 | 0000 | 0121 | MANI | | | | | | | | | | |
| | 0000 | 0722 | CULG | | | | | | | | | | |
| | 0300 | 1005 | MANI | | | | | | | | | | |
| | 0533 | 1738 | DURN | | | | | | | | | | |
| | 0541 | 1100 | WEIS | | | | | | | | | | |
| | 1033 | 2303 | SGMR | | | | | | | | | | |
| | 1316 | 2345 | HARV | | | | | | | | | | |
| | 2036 | 2400 | CULG | | | | | | | | | | |
| | 2156 | 2400 | MANI | | | | | | | | | | |
| 31 | 0000 | 1005 | MANI | | | | | | | | | | |
| | 0000 | 0736 | CULG | | | | | | | | | | |
| | 0532 | 1738 | DURN | | | | | | | | | | |
| | 0740 | 1714 | WEIS | | | | | | | | | | |
| | 1031 | 2304 | SGMR | | | | | | | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

MARCH 1977

| MAR 1977 | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 31 | 1315 | 2345 | HARV | | | | | | | | | | |
| | 2036 | 2400 | CULG | | | | | | | | | | |
| | 2154 | 2400 | MANI | | | | | | | | | | |

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

# SELECTED SOLAR EVENTS

## MARCH 1977

Culgoora

| UT Date 197.7 March | HELIOGRAPH EVENT | | | | | | | Spectral Type | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Start (UT) | End (UT) | Freq. (MHz) | Positions: Central Dist. ($R_\odot$) | Positions: Position Angle (Deg.) | Polarization | Intensity (1-3) | | |
| 2/3 | 2300 | 0500 | 80<br>160 | 1.2<br>1.1 | 20 | ℓ | 1 | I | |
| 8/9 | 2300 | 0500 | 80<br>160 | .7 | 330 | Varying | 1<br>2 | I | Type I activity persisted until 11th, from this region |
| 9 | 0237 | 0239 | 80<br>160 | .7 | 330 | 0 | 2<br>1 | IIIG | * |
| 12 | 0227 | 0234 | 43.25<br>80 | .8 | 325 | 0 | 3 | II | Herringbone |
| 26/27 | 2300 | 0500 | 160 | 1.2 | 20 | ℓ | 1 | I,W | |
| 27 | 0151 | 0159 | 43.25<br>80<br>160 | 1.2 | 20 | 0 | 3 | IIIGG | * |

Days without Heliograph observations: .....Nil.....

* other type III's observed from the same position during the day

# COSMIC RAY INDICES

## (Neutron Monitors)

### MARCH 1977

| Mar. 1977 | THULE Average cts/hr | ALERT Average cts/hr | DEEP RIVER Average cts/hr | CALGARY Average cts/hr | SULPHUR MT Average cts/hr | KIEL Average cts/hr | CLIMAX Average cts/hr | TOKYO Average cts/hr |
|---|---|---|---|---|---|---|---|---|
| 1 | | 7563.6 | 7126.0 | | | 6391.3 | 4297.1 | 3680.1 |
| 2 | | 7552.7 | 7086.3 | | | 6356.5 | 4293.2 | 3665.2 |
| 3 | | 7468.7 | 7019.9 | | | 6300.0 | 4265.2 | 3667.4 |
| 4 | | 7441.3 | 6993.8 | | | 6284.9 | 4241.5 | 3671.8 |
| 5 | | 7445.4 | 6984.7 | | | 6265.1 | 4230.9 | 3666.2 |
| 6 | | 7408.6 | 6972.0 | | | 6264.6 | 4211.0 | 3651.4 |
| 7 | | 7424.6 | 6982.0 | | | 6261.5 | 4212.2 | 3658.8 |
| 8 | | 7445.9 | 6991.4 | | | 6264.6 | 4215.8 | 3654.4 |
| 9 | | 7467.3 | 6982.2 | | | 6291.3 | 4223.2 | 3657.5 |
| 10 | | 7479.5 | 7000.7 | | | 6328.0 | 4269.4 | 3675.3 |
| 11 | | 7487.7 | 7023.5 | | | 6357.2 | 4266.2 | 3681.3 |
| 12 | | 7523.9 | 7045.9 | | | 6390.3 | 4284.6 | 3694.6 |
| 13 | | 7581.0 | 7100.5 | | | 6423.1 | 4321.9 | 3688.0 |
| 14 | | 7599.0 | 7132.3 | | | 6429.3 | 4333.6 | 3685.8 |
| 15 | | 7589.0 | 7123.7 | | | 6407.4 | 4318.8 | 3683.6 |
| 16 | | 7597.0 | 7159.1 | | | 6401.2 | 4317.6 | 3676.0 |
| 17 | | 7600.8 | 7173.0 | | | 6403.9 | 4341.5 | 3675.5 |
| 18 | | 7570.5 | 7144.9 | | | 6398.4 | 4315.7 | 3674.7 |
| 19 | | 7542.8 | 7122.1 | | | 6375.3 | 4285.5 | 3661.6 |
| 20 | | 7553.1 | 7114.4 | | | 6406.6 | 4283.2 | 3667.1 |
| 21 | | 7533.8 | 7102.9 | | | 6402.8 | 4289.8 | 3672.8 |
| 22 | | 7548.6 | 7140.8 | | | 6402.8 | 4304.0 | 3677.6 |
| 23 | | 7501.4 | 7135.4 | | | 6355.3 | 4288.9 | 3665.9 |
| 24 | | 7522.0 | 7103.7 | | | 6358.6 | 4268.5 | 3662.9 |
| 25 | | 7515.3 | 7082.8 | | | 6339.4 | 4268.7 | 3675.5 |
| 26 | | 7517.6 | 7081.2 | | | 6364.9 | 4272.0 | 3690.2 |
| 27 | | 7449.3 | 7047.2 | | | 6362.8 | 4238.1 | 3680.8 |
| 28 | | 7463.1 | 7015.9 | | | 6351.4 | 4271.0 | 3665.0 |
| 29 | | 7476.1 | 7031.0 | | | 6339.9 | 4274.2 | 3660.1 |
| 30 | | 7500.0 | 7035.8 | | | 6341.9 | 4251.2 | 3645.8 |
| 31 | | 7507.2 | 7081.6 | | | 6373.2 | 4254.6 | 3655.8 |
| MEAN | | 7512.2 | 7068.9 | | | 6354.6 | 4274.4 | 3670.6 |

Data not available at time of publication

Data not available at time of publication

Data not abailable at time of publication

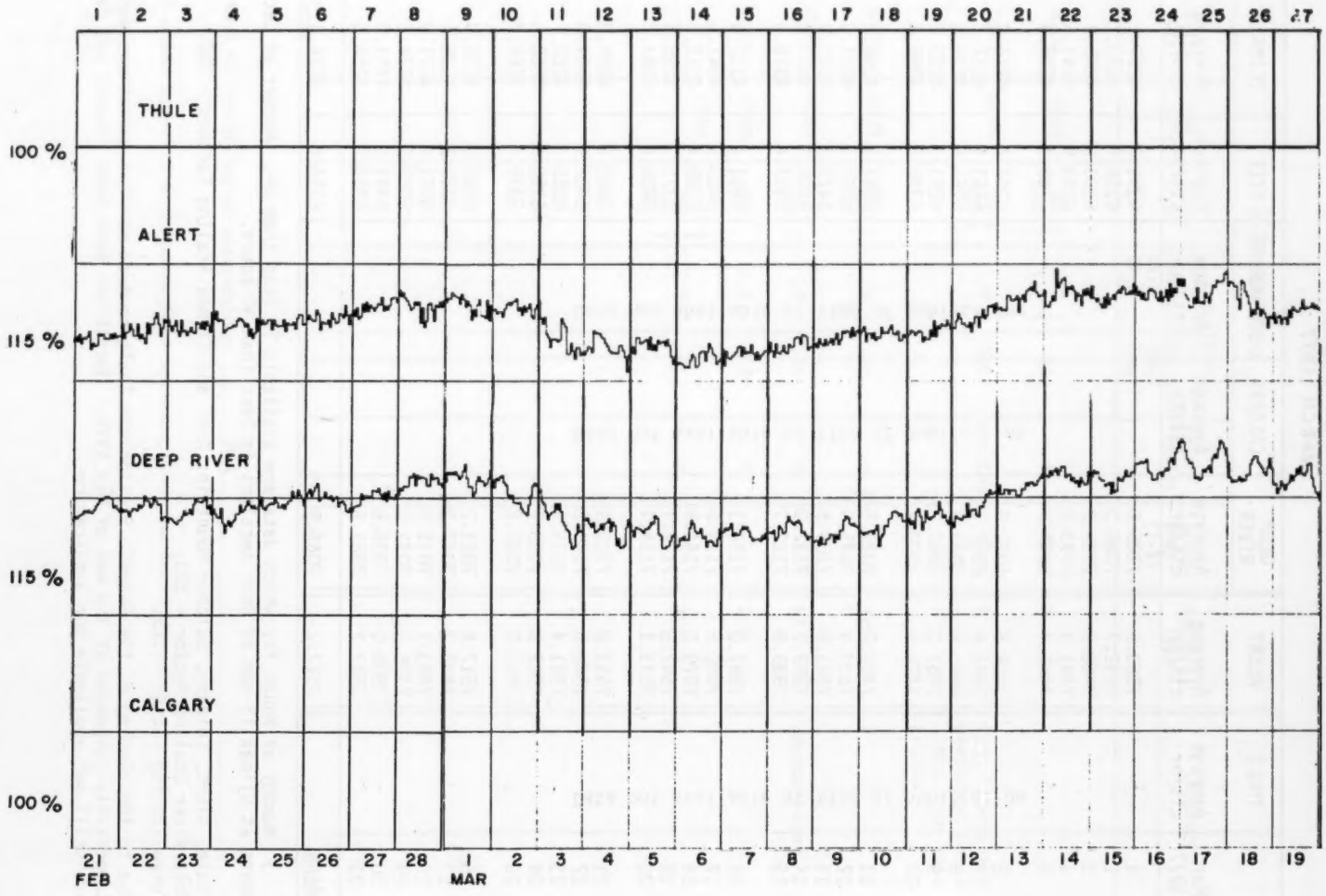
( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Thule, Alert, Calgary, Sulphur Mountain, Kiel and Climax Scaling Factors = 100.
Deep River Scaling Factor = 300.
Tokyo Scaling Factor = 128.

Due to the closing of the Geopole Station the Thule neutron monitor operations were temporarily suspended at the end of May 1976. Operations have been resumed but data are still not available for publication.

# COSMIC RAY INDICES
(Neutron Monitors)

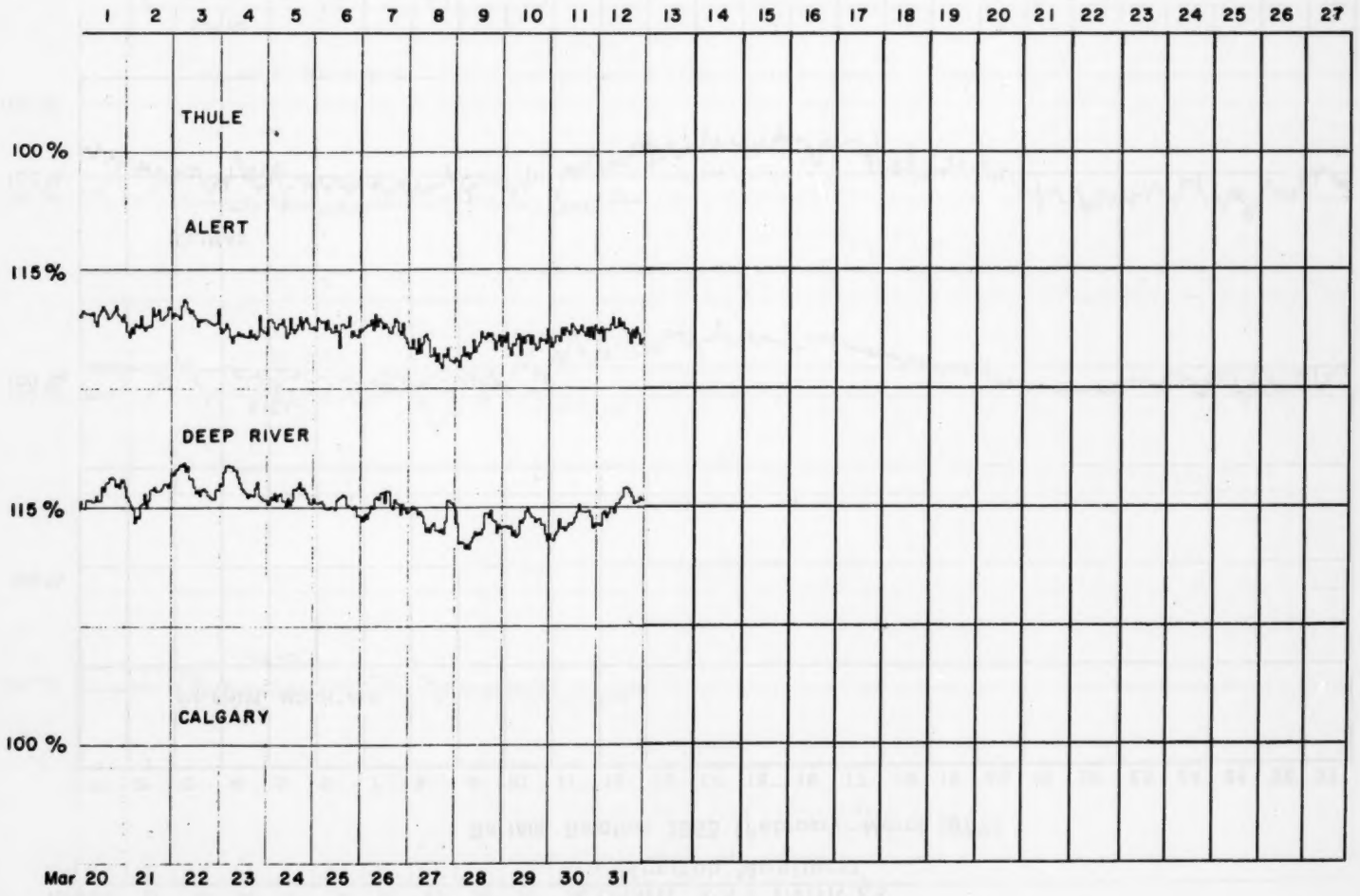
Bartels Rotation 1963 (February - March 1977)



FEB MAR

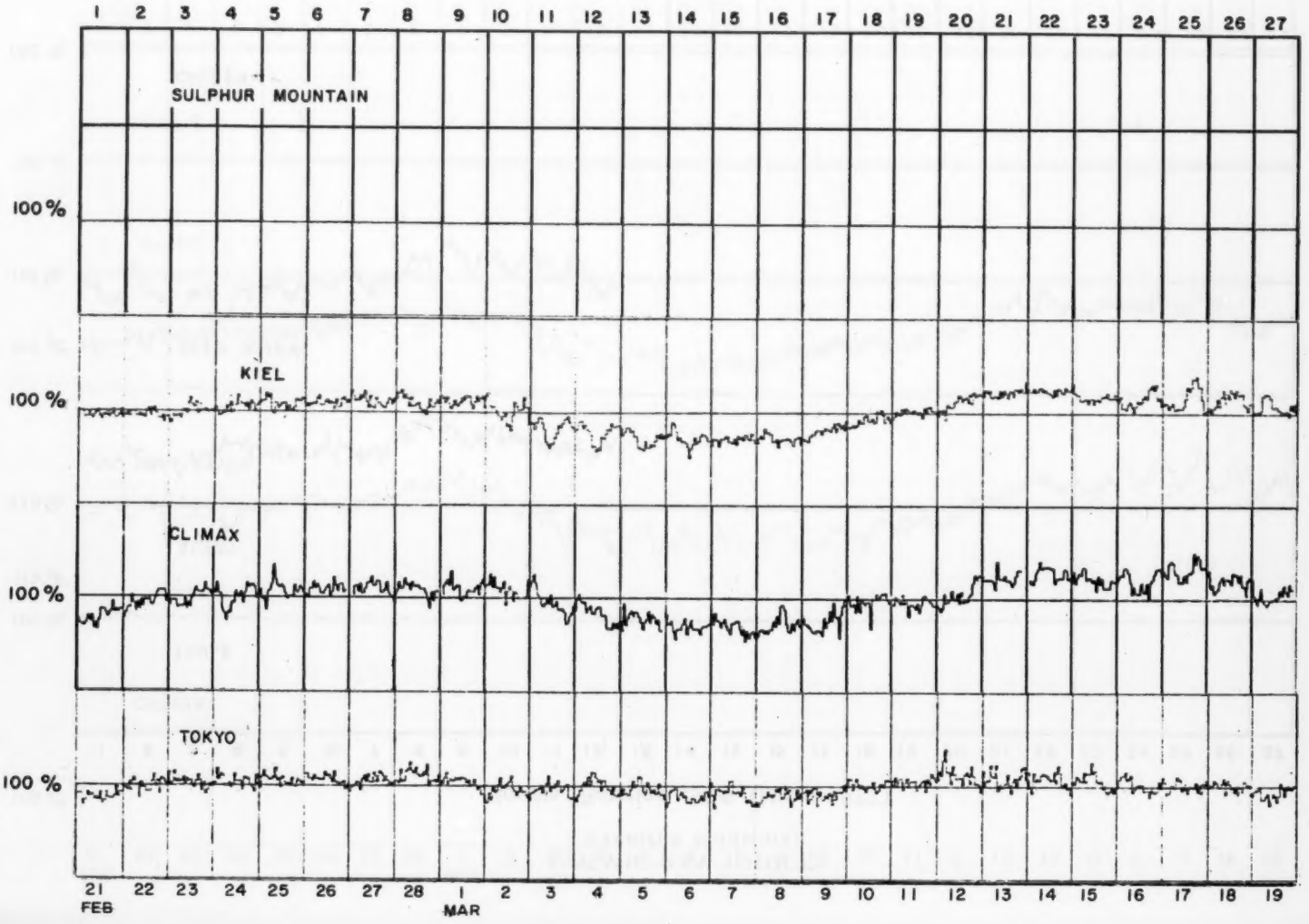
## COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1964 (March 1977)



# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1963 (February - March 1977)

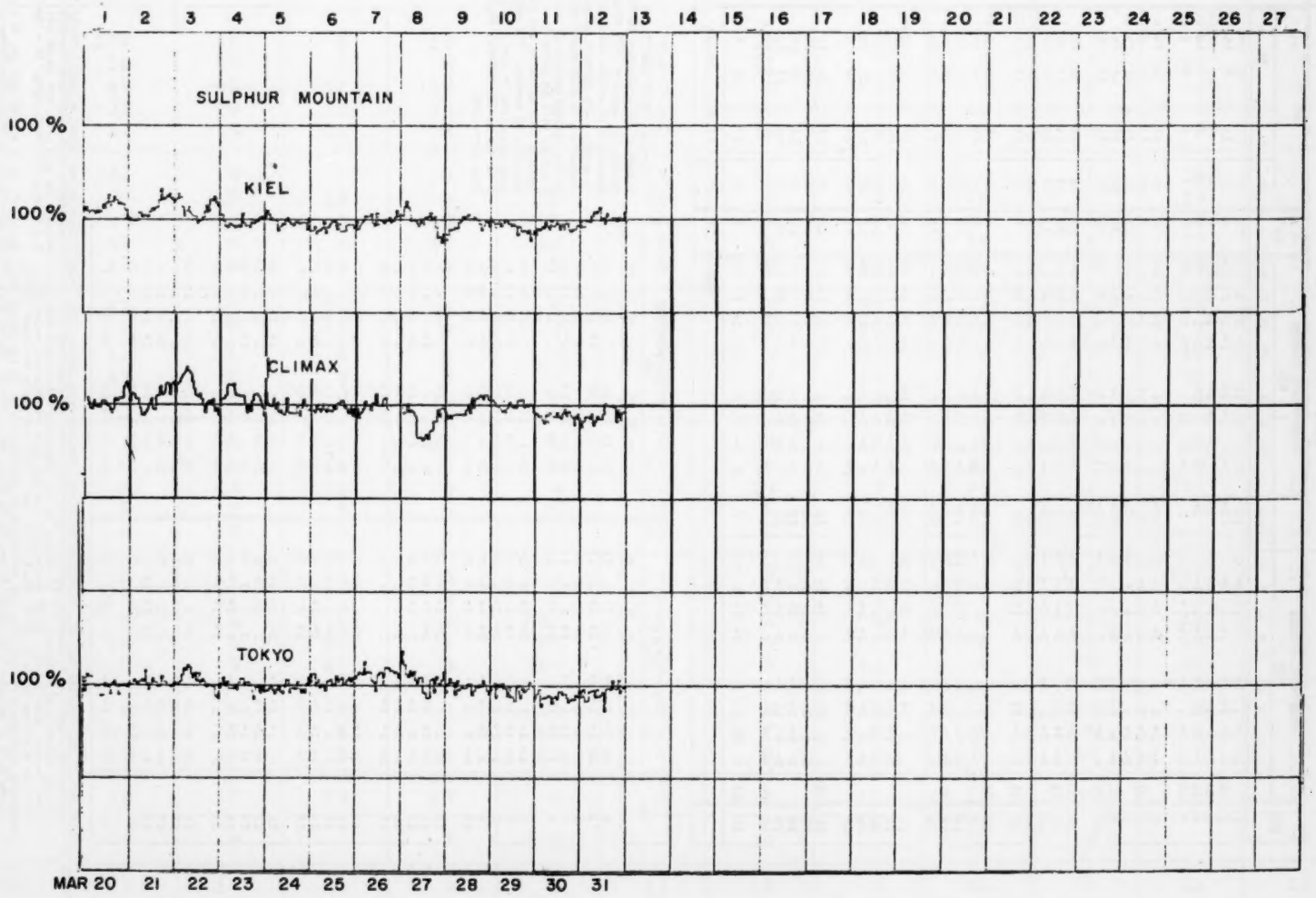


21 22 23 24 25 26 27 28 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

FEB MAR

# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1964 (March 1977)



# GEOMAGNETIC ACTIVITY INDICES

MARCH 1977

| Day | Three-Hourly Indices Kp | | | | | | | | | Three-Hourly Indices Km | | | | | | | | Ap | aa * | | | | | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | N | S | M | | | |
| 1 | | 3 | 1- | 1 | 2- | 2- | 2+ | 3+ | 4 | 18- | 2+ | 1 | 1+ | 1+ | 2- | 3- | 3 | 4- | 11 | 25 | 14 | 12 | 29 | | 0.6 |
| 2 | Q5 | 0 | 1- | 1- | 2- | 1+ | 1 | 2+ | 2 | 10- | 1- | 1 | 1- | 2- | 1+ | 1+ | 2 | 2+ | 5 | 12 | 11 | 8 | 15 | C | 0.2 |
| 3 | Q4 | 2 | 1 | 1 | 1 | 1 | 1- | 0+ | 1- | 8- | 2 | 1+ | 1+ | 1+ | 1+ | 1+ | 1- | 1- | 4 | 8 | 9 | 11 | 7 | CC | 0.1 |
| 4 | Q1 | 0 | 0+ | 1 | 0+ | 1+ | 1- | 1- | 1 | 5+ | 0+ | 1- | 1 | 0+ | 2- | 1 | 1+ | 1+ | 3 | 8 | 6 | 5 | 10 | CC | 0.1 |
| 5 | Q2 | 1- | 2- | 1 | 1- | 1+ | 0+ | 1 | 0+ | 7 | 1+ | 2- | 1+ | 1 | 2- | 1 | 1 | 1- | 4 | 7 | 9 | 8 | 8 | CC | 0.1 |
| 6 | | 0+ | 1- | 1 | 1 | 3- | 2+ | 2+ | 2 | 12+ | 1 | 1 | 1 | 1 | 3- | 2+ | 2+ | 2+ | 6 | 19 | 13 | 9 | 24 | K | 0.3 |
| 7 | Q7 | 2+ | 2- | 2 | 1 | 1 | 1+ | 1- | 1 | 11 | 2 | 1+ | 2- | 1+ | 1+ | 1+ | 1 | 1 | 5 | 10 | 10 | 11 | 9 | CK | 0.2 |
| 8 | | 2- | 1+ | 1 | 1 | 2- | 3 | 3 | 5- | 17+ | 1+ | 1+ | 1+ | 1 | 2- | 3 | 3 | 4- | 12 | 22 | 16 | 18 | 29 | | 0.7 |
| 9 | D1 | 4- | 4 | 5- | 4+ | 5+ | 5 | 4 | 5+ | 36+ | 3 | 3 | 4 | 4- | 5- | 5- | 4- | 5 | 38 | 59 | 57 | 41 | 75 | | 1.4 |
| 10 | D4* | 4 | 4- | 4- | 2+ | 3 | 3 | 3+ | 4- | 27- | 4 | 3+ | 3 | 3- | 3 | 3- | 3 | 3+ | 19 | 38 | 36 | 37 | 36 | | 1.0 |
| 11 | D3* | 3 | 3- | 2+ | 2+ | 3- | 4- | 5- | 4- | 25 | 3- | 2+ | 2+ | 2+ | 3- | 4- | 4 | 4- | 18 | 36 | 28 | 20 | 45 | | 1.0 |
| 12 | D2 | 4+ | 3+ | 4- | 4- | 2- | 4- | 4+ | 3+ | 28 | 4- | 2+ | 3+ | 3+ | 2- | 4- | 4- | 4- | 22 | 40 | 24 | 31 | 33 | | 1.1 |
| 13 | | 4+ | 3- | 2 | 2- | 2- | 2+ | 2+ | 4- | 21- | 4- | 2 | 2+ | 2- | 2 | 3- | 3- | 3 | 13 | 30 | 20 | 24 | 27 | | 0.7 |
| 14 | | 4+ | 4+ | 3- | 1 | 1 | 1+ | 1 | 1+ | 17 | 4- | 3+ | 2+ | 1+ | 2 | 2- | 1 | 2- | 12 | 22 | 16 | 18 | 18 | | 0.7 |
| 15 | Q6 | 2- | 1- | 2+ | 2 | 2- | 1+ | 0+ | 0 | 10 | 1 | 1 | 2+ | 2- | 2- | 1 | 0+ | 0 | 5 | 13 | 10 | 13 | 11 | CC | 0.2 |
| 16 | Q8 | 2- | 2+ | 2- | 1 | 1- | 1 | 2+ | 2+ | 13 | 1+ | 1+ | 2- | 1 | 1 | 1 | 2+ | 2 | 6 | 15 | 9 | 11 | 13 | CK | 0.3 |
| 17 | | 3- | 2+ | 1 | 2 | 2 | 3 | 3 | 2- | 18- | 2+ | 2- | 1 | 2- | 2 | 3- | 3 | 2- | 9 | 24 | 15 | 16 | 24 | | 0.5 |
| 18 | | 4- | 4- | 2 | 2 | 3- | 2- | 2- | 1+ | 19- | 3- | 3 | 1+ | 2- | 2+ | 2- | 2- | 1+ | 11 | 24 | 15 | 25 | 15 | | 0.6 |
| 19 | Q8 | 0+ | 2- | 1+ | 0+ | 0+ | 1+ | 2+ | 2+ | 10 | 1- | 1+ | 1+ | 0+ | 0+ | 1+ | 2 | 2+ | 5 | 13 | 10 | 9 | 14 | C | 0.2 |
| 20 | | 4 | 2+ | 1+ | 2 | 1+ | 2- | 3 | 4 | 20- | 3+ | 2- | 2- | 2 | 1 | 2- | 3 | 4- | 13 | 27 | 17 | 22 | 23 | | 0.7 |
| 21 | | 1 | 2 | 1+ | 1 | 1+ | 3- | 4 | 3+ | 17- | 1 | 2- | 1+ | 1+ | 1+ | 3- | 4- | 3+ | 10 | 24 | 17 | 9 | 32 | | 0.6 |
| 22 | | 3- | 2+ | 3- | 2 | 1 | 2 | 1- | 0 | 13+ | 3- | 2- | 2+ | 2 | 1 | 2- | 1 | 0+ | 7 | 14 | 14 | 18 | 11 | | 0.3 |
| 23 | | 2- | 1+ | 3 | 2 | 3 | 3 | 3+ | 4 | 21+ | 1+ | 1 | 3- | 2 | 3- | 3 | 3+ | 3+ | 14 | 26 | 21 | 15 | 33 | | 0.8 |
| 24 | | 4+ | 3 | 2- | 2- | 2+ | 2+ | 2 | 3- | 20 | 3 | 2+ | 2- | 2- | 2 | 3- | 2 | 3- | 12 | 22 | 17 | 21 | 19 | | 0.7 |
| 25 | | 3 | 2- | 1- | 2+ | 2- | 2- | 4 | 4 | 19 | 2+ | 1 | 1 | 2 | 2- | 2- | 4- | 3+ | 12 | 33 | 16 | 16 | 34 | | 0.7 |
| 26 | D5* | 4 | 5 | 3- | 2 | 2 | 3+ | 2- | 0+ | 21 | 3+ | 4- | 2+ | 2 | 2+ | 3 | 2- | 0+ | 16 | 29 | 23 | 34 | 17 | | 0.9 |
| 27 | | 1+ | 1 | 2+ | 2- | 2- | 1+ | 3- | 3+ | 15+ | 1+ | 1 | 3- | 2 | 2 | 1 | 2+ | 3 | 8 | 20 | 15 | 15 | 21 | | 0.4 |
| 28 | | 3 | 4- | 2+ | 2- | 2 | 3+ | 3 | 4 | 23 | 2+ | 3- | 2+ | 2- | 2- | 3 | 3- | 4- | 15 | 27 | 18 | 18 | 28 | | 0.8 |
| 29 | | 5- | 4 | 1+ | 2- | 3- | 2+ | 2+ | 1 | 20 | 4 | 3+ | 2- | 2- | 2+ | 2+ | 2+ | 1 | 14 | 24 | 20 | 23 | 22 | | 0.8 |
| 30 | Q9 | 0+ | 1- | 2 | 2 | 1 | 2+ | 1+ | 2- | 11+ | 0+ | 1 | 2 | 2- | 1- | 3- | 1+ | 2- | 5 | 12 | 12 | 12 | 12 | C | 0.2 |
| 31 | Q3 | 2 | 0+ | 1- | 1 | 0+ | 0+ | 1 | 1+ | 7 | 2 | 1- | 1- | 2- | 1- | 1- | 1 | 1+ | 4 | 8 | 10 | 10 | 8 | CC | 0.1 |
| | | | | | | | | | | | | | | | | | | Mean | 11 | 22.4 | 17.2 | 20.0 | | | 0.55 |

| Day | Three-Hourly Indices Kn | | | | | | | | Three-Hourly Indices Ks | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | 2+ | 1- | 1 | 1+ | 2- | 2+ | 3 | 3+ | 2+ | 1+ | 2- | 1+ | 2 | 3- | 3 | 4- |
| 2 | 0+ | 0+ | 1- | 2- | 1+ | 1+ | 2- | 2+ | 1 | 1+ | 1 | 1+ | 1+ | 1+ | 2 | 2 |
| 3 | 2- | 1- | 1 | 1 | 1+ | 1+ | 0+ | 0+ | 2 | 2- | 1+ | 1+ | 1 | 1+ | 1- | 1 |
| 4 | 0 | 1- | 1 | 0+ | 1+ | 1 | 1 | 1+ | 1- | 1- | 1 | 0+ | 2- | 1 | 1+ | 1+ |
| 5 | 1 | 2- | 1 | 1 | 1+ | 1- | 1 | 0+ | 1+ | 1+ | 1+ | 1 | 2 | 1 | 1 | 1+ |
| 6 | 1- | 1- | 1 | 1 | 3- | 2+ | 2 | 2+ | 1+ | 1 | 1+ | 1 | 3 | 2+ | 3- | 2+ |
| 7 | 2- | 1+ | 2- | 1+ | 1+ | 1 | 1- | 1 | 2 | 1+ | 2- | 1+ | 2- | 2- | 1+ | 1 |
| 8 | 1 | 1+ | 1 | 1 | 2- | 3- | 3 | 4- | 2- | 1+ | 1+ | 1 | 2 | 3 | 3 | 4 |
| 9 | 3 | 3+ | 4+ | 4- | 5- | 4+ | 4- | 5- | 3+ | 3 | 4- | 3+ | 5- | 5- | 4- | 5 |
| 10 | 4- | 3 | 3 | 3- | 3- | 3- | 3 | 3 | 4+ | 4- | 3 | 2+ | 3 | 3- | 3+ | 3+ |
| 11 | 2+ | 2+ | 2 | 3- | 3- | 3+ | 4- | 3+ | 3- | 2+ | 2+ | 2- | 3- | 4- | 4 | 4 |
| 12 | 4- | 2+ | 3+ | 4- | 2- | 3+ | 3+ | 3+ | 4 | 2 | 3 | 3 | 2- | 4- | 4 | 4 |
| 13 | 3+ | 2 | 2+ | 2- | 2 | 2+ | 2+ | 3- | 4 | 2 | 2+ | 1+ | 2- | 3- | 3- | 3+ |
| 14 | 4- | 3+ | 2+ | 2- | 2- | 2- | 1 | 2- | 4 | 3 | 2 | 1+ | 2 | 2- | 1 | 2- |
| 15 | 1- | 1- | 2+ | 2 | 2 | 1 | 0 | 0 | 1+ | 1 | 2+ | 1+ | 2- | 1 | 0+ | 0 |
| 16 | 1+ | 1+ | 2 | 1 | 1 | 1 | 2+ | 2 | 1+ | 1+ | 1 | 1 | 1 | 1 | 2+ | 2+ |
| 17 | 2+ | 2- | 1 | 2- | 2+ | 3 | 3- | 2- | 2+ | 2 | 1 | 2- | 2- | 3- | 3 | 2- |
| 18 | 3- | 3 | 1+ | 2 | 3- | 2- | 1+ | 2- | 3- | 3 | 1+ | 1+ | 2 | 2- | 2- | 1+ |
| 19 | 0+ | 1+ | 2- | 0+ | 1- | 1+ | 2 | 2 | 1- | 1+ | 1+ | 0+ | 0+ | 1+ | 2- | 2+ |
| 20 | 3+ | 2- | 2- | 2 | 1+ | 2 | 3- | 3+ | 3+ | 1+ | 2 | 2- | 1 | 2- | 3 | 4 |
| 21 | 1 | 1+ | 2- | 1+ | 2- | 3- | 3+ | 3 | 1+ | 2- | 1+ | 1 | 1+ | 3 | 4- | 3+ |
| 22 | 3- | 2- | 2+ | 2 | 1 | 2- | 1- | 0 | 3- | 1+ | 2 | 2 | 1 | 2 | 1 | 1- |
| 23 | 1+ | 1- | 3 | 2 | 3 | 3 | 3 | 3+ | 2- | 1 | 3- | 2 | 2+ | 3 | 4- | 3+ |
| 24 | 3 | 2+ | 2 | 2- | 2 | 3- | 2- | 3- | 3+ | 2+ | 1+ | 2- | 2 | 3 | 2+ | 3 |
| 25 | 2 | 1 | 1 | 2 | 2- | 2- | 4- | 3 | 3- | 1+ | 1 | 2 | 2- | 2- | 4 | 3+ |
| 26 | 3+ | 4- | 2+ | 2- | 3- | 3 | 2 | 0 | 3+ | 4- | 3- | 2 | 2+ | 3 | 2- | 1- |
| 27 | 1+ | 1 | 2+ | 2 | 2 | 1+ | 3- | 3 | 1+ | 1+ | 3 | 2 | 2 | 1- | 2+ | 3 |
| 28 | 3- | 3- | 2+ | 2- | 2 | 3 | 3 | 3 | 2+ | 3- | 2 | 2- | 2- | 3 | 3- | 4 |
| 29 | 4 | 3 | 2- | 2- | 2+ | 2+ | 2+ | 1 | 4 | 4- | 2- | 1+ | 2+ | 3- | 2+ | 1- |
| 30 | 0+ | 1- | 2 | 2 | 1 | 2+ | 1+ | 2- | 1- | 1+ | 2 | 1+ | 0+ | 3- | 1+ | 2- |
| 31 | 2- | 1- | 1- | 2- | 1 | 1- | 1 | 2- | 2+ | 1- | 1- | 1+ | 0+ | 1- | 1 | 1 |

* Errata: Note that the N and M values of aa published in these tables for January 1974 through January 1977 values were slightly in error. The correct values (resulting in some modifications in the classification of the days C and K) will be given in a supplementary IAGA Bulletin and the Bulletin 32 series. The magnetic tape deposited in World Data Center A for Solar-Terrestrial Physics has been corrected.

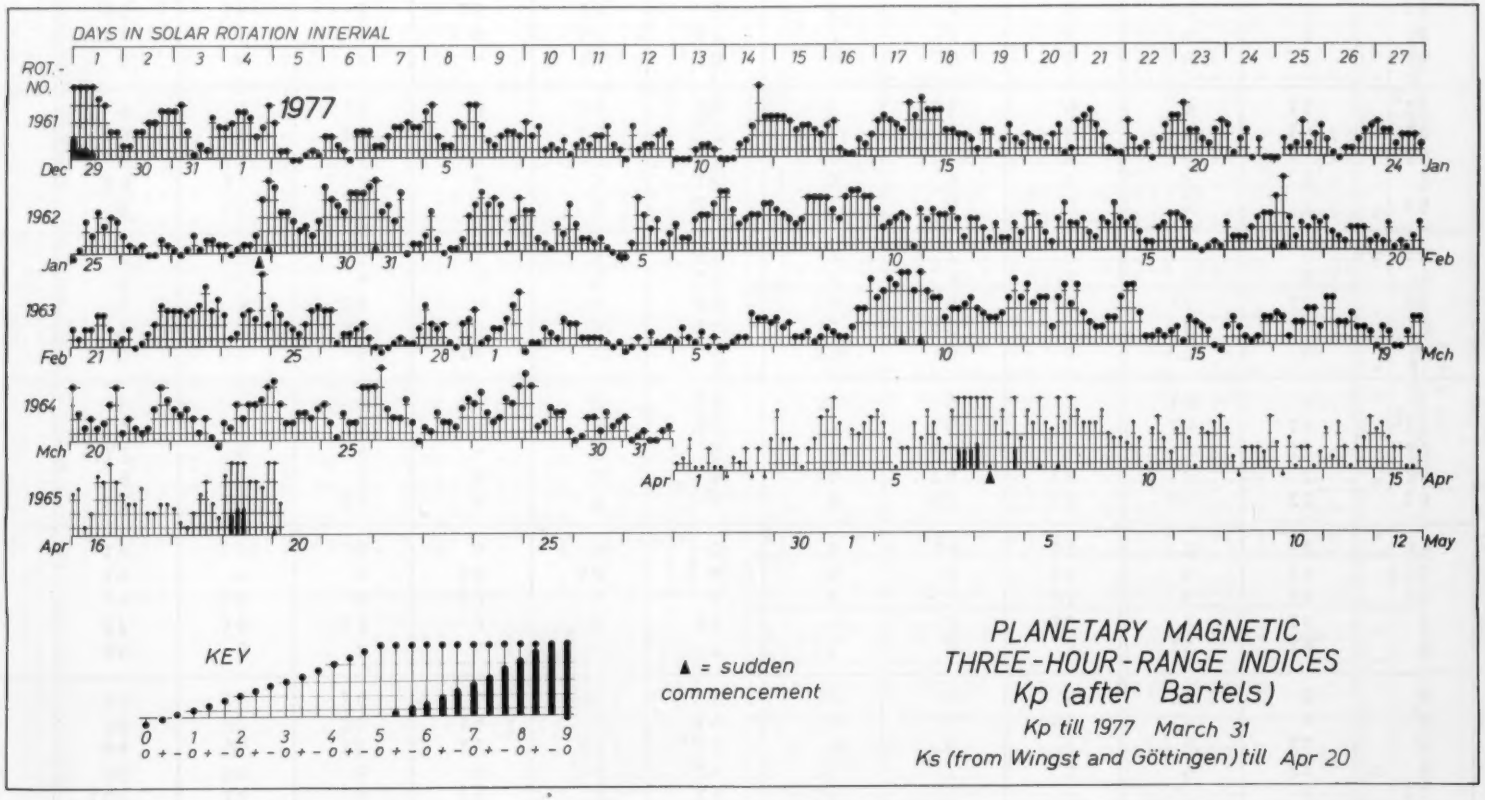
Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values >3-"). An * means "not really disturbed" (Ap<20).

Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

# DAILY AVERAGE INDICES Ap

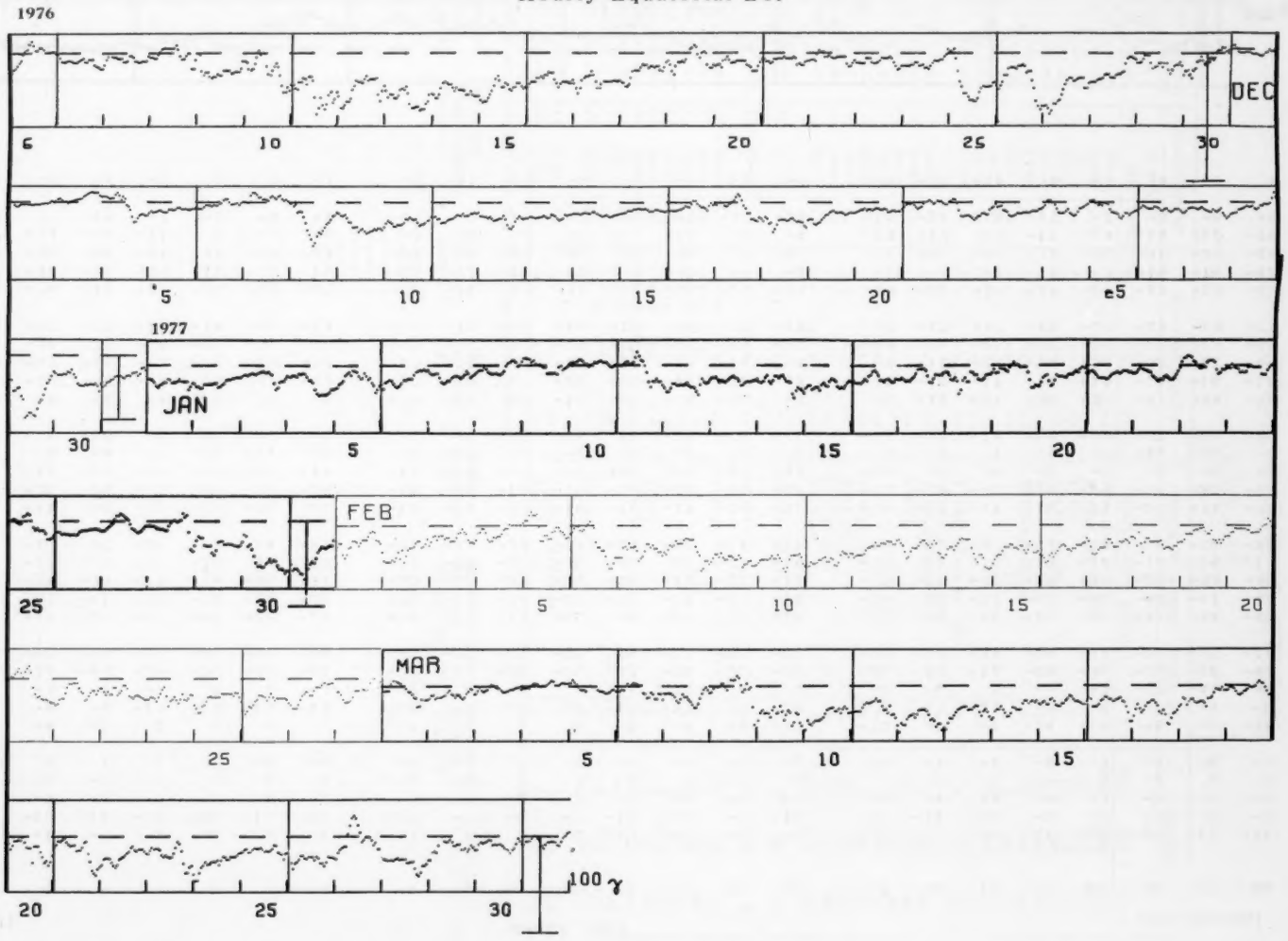
| | 1976 | | | | | | | | | 1977 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR |
| 1 | 107 | 10 | 6 | 18 | 8 | 10 | 14 | 10 | 7 | 17 | 7 | 11 |
| 2 | 16 | 58 | 6 | 9 | 8 | 24 | 21 | 7 | 3 | 5 | 21 | 5 |
| 3 | 44 | 94 | 12 | 12 | 10 | 10 | 9 | 6 | 4 | 6 | 11 | 4 |
| 4 | 30 | 20 | 20 | 14 | 5 | 14 | 6 | 4 | 15 | 10 | 4 | 3 |
| 5 | 27 | 14 | 20 | 6 | 6 | 9 | 13 | 3 | 6 | 15 | 9 | 4 |
| 6 | 30 | 8 | 7 | 6 | 5 | 7 | 11 | 2 | 3 | 10 | 14 | 6 |
| 7 | 27 | 10 | 13 | 9 | 5 | 10 | 6 | 3 | 10 | 7 | 18 | 5 |
| 8 | 14 | 10 | 8 | 13 | 4 | 7 | 6 | 6 | 23 | 6 | 18 | 12 |
| 9 | 16 | 4 | 4 | 10 | 12 | 6 | 6 | 8 | 16 | 6 | 25 | 38 |
| 10 | 12 | 6 | 6 | 6 | 9 | 5 | 6 | 18 | 13 | 3 | 12 | 19 |
| 11 | 12 | 11 | 26 | 4 | 5 | 4 | 8 | 23 | 13 | 14 | 13 | 18 |
| 12 | 9 | 7 | 7 | 5 | 3 | 8 | 14 | 24 | 15 | 12 | 7 | 22 |
| 13 | 13 | 6 | 4 | 4 | 3 | 5 | 8 | 31 | 8 | 7 | 12 | 13 |
| 14 | 15 | 4 | 3 | 6 | 4 | 10 | 7 | 16 | 4 | 18 | 11 | 12 |
| 15 | 4 | 5 | 4 | 19 | 2 | 10 | 33 | 9 | 2 | 13 | 8 | 5 |
| 16 | 8 | 5 | 5 | 16 | 6 | 6 | 29 | 5 | 8 | 7 | 6 | 6 |
| 17 | 5 | 4 | 14 | 5 | 5 | 10 | 30 | 7 | 10 | 6 | 9 | 9 |
| 18 | 2 | 3 | 21 | 6 | 4 | 33 | 19 | 5 | 28 | 10 | 17 | 11 |
| 19 | 5 | 12 | 4 | 6 | 6 | 20 | 7 | 9 | 7 | 8 | 6 | 5 |
| 20 | 2 | 19 | 5 | 4 | 5 | 51 | 7 | 7 | 5 | 12 | 5 | 13 |
| 21 | 5 | 11 | 3 | 3 | 8 | 24 | 7 | 4 | 4 | 5 | 7 | 10 |
| 22 | 19 | 11 | 3 | 4 | 5 | 17 | 5 | 5 | 8 | 7 | 8 | 7 |
| 23 | 8 | 14 | 4 | 5 | 30 | 12 | 6 | 4 | 5 | 6 | 18 | 14 |
| 24 | 16 | 6 | 16 | 4 | 25 | 7 | 6 | 3 | 6 | 8 | 14 | 12 |
| 25 | 9 | 9 | 18 | 9 | 24 | 24 | 5 | 11 | 9 | 9 | 11 | 12 |
| 26 | 6 | 6 | 7 | 4 | 18 | 13 | 4 | 9 | 6 | 4 | 8 | 16 |
| 27 | 11 | 5 | 6 | 8 | 13 | 12 | 7 | 8 | 6 | 4 | 3 | 8 |
| 28 | 10 | 14 | 5 | 16 | 10 | 5 | 5 | 2 | 6 | 13 | 7 | 15 |
| 29 | 17 | 22 | 5 | 18 | 6 | 10 | 3 | 6 | 45 | 15 | | 14 |
| 30 | 10 | 17 | 29 | 19 | 6 | 9 | 16 | 11 | 13 | 30 | | 5 |
| 31 | | 9 | | 7 | 5 | | 34 | | 12 | 19 | | 4 |
| MEAN | 17 | 14 | 10 | 9 | 9 | 13 | 12 | 9 | 10 | 10 | 11 | 11 |

# GEOMAGNETIC ACTIVITY INDICES




GEOMAGNETIC ACTIVITY INDICES

## GEOMAGNETIC ACTIVITY INDICES
### Hourly Equatorial Dst



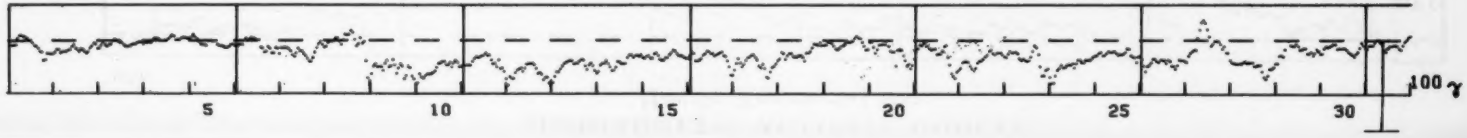

Note the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

# HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

(Time-UT) MARCH 1977 (Units-Gammas)

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -5 | -6 | -5 | -5 | 2 | 5 | 5 | 4 | 3 | 2 | 0 | 0 | -3 | -6 | -7 | -9 | -12 | -13 | -22 | -21 | -14 | -15 | -15 | -15 |
| 2 | -13 | -10 | -10 | -14 | -12 | -12 | -12 | -11 | -10 | -7 | -5 | -9 | -10 | -12 | -9 | -10 | -12 | -14 | -12 | -8 | -6 | -3 | -4 | -9 |
| 3 | -8 | -5 | -2 | -5 | -7 | -5 | -4 | -1 | 1 | 0 | -2 | -3 | -3 | -5 | -7 | -7 | -6 | -5 | -4 | -4 | -3 | -2 | -2 | -4 |
| 4 | -3 | -3 | -6 | -3 | 0 | 2 | 2 | 1 | -1 | -1 | 0 | 0 | 1 | 3 | 5 | 4 | 0 | 0 | 0 | 2 | 3 | 2 | 2 | 2 |
| 5 | 3 | 6 | 3 | 1 | -2 | -4 | -5 | -5 | -6 | -1 | 0 | -1 | -1 | -1 | -5 | -6 | -6 | -7 | -8 | -8 | -7 | -5 | -4 | -6 |
| 6 | -5 | -6 | -4 | -5 | 0 | 2 | 0 | 1 | 3 | 2 | 1 | 0 | 0 | -6 | -9 | -13 | -12 | -7 | -9 | -14 | -14 | -8 | -9 | -15 |
| 7 | -8 | -8 | -8 | -8 | -10 | -12 | -16 | -16 | -14 | -9 | -12 | -12 | -15 | -17 | -20 | -23 | -23 | -19 | -13 | -8 | -4 | -2 | -5 | -8 |
| 8 | -7 | -3 | -1 | -2 | -1 | 2 | 2 | -2 | -5 | 0 | 6 | 5 | 6 | 10 | 8 | 0 | -7 | -4 | 2 | -4 | -2 | -23 | -41 | -44 |
| 9 | -26 | -28 | -26 | -29 | -26 | -29 | -33 | -25 | -22 | -29 | -28 | -21 | -27 | -36 | -30 | -26 | -28 | -42 | -38 | -28 | -30 | -39 | -42 | -48 |
| 10 | -46 | -36 | -40 | -41 | -38 | -36 | -37 | -36 | -35 | -33 | -29 | -25 | -24 | -23 | -23 | -27 | -27 | -24 | -25 | -24 | -22 | -24 | -29 | -28 |
| 11 | -28 | -27 | -27 | -27 | -27 | -23 | -20 | -16 | -19 | -18 | -17 | -16 | -14 | -17 | -16 | -22 | -26 | -25 | -25 | -21 | -31 | -30 | -34 | -42 |
| 12 | -49 | -39 | -41 | -41 | -35 | -32 | -31 | -30 | -34 | -30 | -26 | -25 | -25 | -25 | -27 | -31 | -36 | -35 | -37 | -43 | -40 | -40 | -47 | -44 |
| 13 | -46 | -39 | -34 | -34 | -31 | -28 | -25 | -24 | -23 | -22 | -23 | -26 | -25 | -25 | -23 | -21 | -22 | -28 | -32 | -27 | -25 | -28 | -33 | -36 |
| 14 | -34 | -27 | -25 | -25 | -22 | -26 | -29 | -33 | -32 | -29 | -23 | -24 | -26 | -26 | -25 | -19 | -16 | -16 | -19 | -17 | -16 | -18 | -16 | -19 |
| 15 | -20 | -18 | -17 | -20 | -20 | -15 | -14 | -17 | -21 | -22 | -22 | -19 | -19 | -16 | -14 | -11 | -12 | -15 | -17 | -17 | -18 | -19 | -20 | -20 |
| 16 | -17 | -13 | -15 | -23 | -23 | -22 | -20 | -16 | -15 | -12 | -13 | -15 | -15 | -17 | -16 | -15 | -14 | -13 | -17 | -18 | -23 | -29 | -38 | -38 |
| 17 | -32 | -25 | -20 | -25 | -29 | -26 | -22 | -19 | -18 | -16 | -16 | -19 | -22 | -28 | -30 | -26 | -31 | -40 | -41 | -34 | -29 | -28 | -26 | -22 |
| 18 | -20 | -13 | -15 | -21 | -17 | -15 | -15 | -16 | -19 | -18 | -17 | -17 | -19 | -23 | -14 | -14 | -12 | -8 | -4 | -5 | -6 | -3 | -6 | -6 |
| 19 | -5 | -2 | -3 | -4 | -7 | -10 | -11 | -9 | -7 | -6 | -4 | -2 | -3 | -2 | -1 | 2 | 4 | 2 | 1 | -3 | -7 | -11 | -10 | -2 |
| 20 | -2 | -8 | -14 | -10 | -5 | -5 | -4 | -5 | -1 | -7 | -12 | -13 | -13 | -28 | -11 | -11 | -11 | -17 | -22 | -28 | -26 | -31 | -27 | -20 |
| 21 | -12 | -9 | -5 | -6 | -4 | -3 | -7 | -9 | -11 | -10 | -10 | -16 | -15 | -15 | -12 | -7 | -6 | -19 | -27 | -36 | -39 | -41 | -34 | -32 |
| 22 | -30 | -24 | -23 | -23 | -24 | -26 | -31 | -33 | -30 | -24 | -23 | -22 | -20 | -16 | -16 | -12 | -11 | -15 | -16 | -14 | -14 | -14 | -16 | -18 |
| 23 | -19 | -15 | -12 | -14 | -13 | -13 | -15 | -20 | -22 | -20 | -22 | -23 | -22 | -18 | -12 | -6 | -8 | -16 | -29 | -39 | -38 | -32 | -31 | -40 |
| 24 | -47 | -46 | -38 | -32 | -30 | -27 | -30 | -29 | -27 | -26 | -27 | -25 | -30 | -25 | -21 | -22 | -24 | -24 | -21 | -21 | -22 | -20 | -18 | -17 |
| 25 | -16 | -14 | -13 | -17 | -16 | -14 | -12 | -13 | -13 | -12 | -14 | -16 | -15 | -16 | -15 | -13 | -9 | -10 | -17 | -18 | -19 | -24 | -18 | -17 |
| 26 | -21 | -28 | -34 | -28 | -27 | -24 | -20 | -20 | -23 | -24 | -21 | -21 | -22 | -25 | -21 | -23 | -28 | -28 | -31 | -27 | -21 | -22 | -22 | -23 |
| 27 | -24 | -17 | -14 | -12 | -11 | -11 | 2 | 11 | 19 | 21 | 18 | 11 | 3 | -7 | -4 | -1 | -1 | -2 | -5 | -10 | -7 | -14 | -14 | -22 |
| 28 | -24 | -25 | -26 | -26 | -25 | -26 | -24 | -23 | -25 | -24 | -24 | -24 | -28 | -28 | -27 | -27 | -34 | -40 | -42 | -36 | -31 | -31 | -29 | -25 |
| 29 | -25 | -17 | -16 | -18 | -10 | 0 | -1 | -6 | -7 | -7 | -4 | -7 | -11 | -11 | -9 | -9 | -15 | -15 | -13 | -17 | -14 | -10 | -12 | -15 |
| 30 | -15 | -9 | -7 | -8 | -7 | -6 | -4 | -5 | -10 | -9 | -10 | -9 | -9 | -11 | -13 | -19 | -16 | -18 | -15 | -13 | -8 | -3 | -6 | -9 |
| 31 | -10 | -6 | -6 | -6 | -3 | 0 | 0 | -3 | -5 | -11 | -13 | -9 | -7 | -7 | -6 | -6 | -7 | -10 | -11 | -6 | -2 | 0 | 3 | 4 |



# PRINCIPAL MAGNETIC STORMS

MARCH 1977

| OBS. 2 letter IAGA code | GEOMAG-NETIC LATI-TUDE | COMMENCEMENT DAY | COMMENCEMENT hr min (UT) | TYPE | SC - AMPLITUDES D(') | SC - AMPLITUDES H(γ) | SC - AMPLITUDES Z(γ) | MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD) | K | RANGES D(') | RANGES H(γ) | RANGES Z(γ) | UT END DAY | UT END HOUR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO | 64.6N | 8 | 08-- | .. | .. | .. | .. | 09(4,5) | 7 | 240 | 1630 | 800 | 10 | 20 |
| NE | 55.1N | 8 | 1154 | .. | .. | .. | .. | 09(3,5,6) 12(1) | 5 | 27 | 142 | 135 | 14 | 10 |
| WI | 54.2N | 8 | 16-- | .. | .. | .. | .. | 09(8) | 6 | 26 | 205 | 45 | 10 | 03 |
| FR | 49.6N | 8 | 17-- | .. | .. | .. | .. | 09(3,5,6,8) | 5 | 19 | 125 | 55 | 10 | 10 |
| BD | 48.9N | 8 | 15-- | .. | .. | .. | .. | 09(3) | 5 | 23 | 134 | 57 | 14 | 18 |
| IR | 41.0N | 8 | 1300 | .. | .. | .. | .. | 09(3,4,5,6,8) | 5 | 20 | 81 | 25 | 10 | 21 |
| JP | 17.3N | 8 | 18-- | .. | .. | .. | .. | | - | 6 | 61 | 37 | 10 | 17 |
| SH | 14.6N | 8 | 18-- | .. | .. | .. | .. | | - | 4 | 69 | 26 | 10 | 17 |
| UJ | 13.5N | 8 | 18-- | .. | .. | .. | .. | | - | -- | -- | -- | 10 | 17 |
| AL | 09.5N | 8 | 18-- | .. | .. | .. | .. | 08(8) 09(3,6,7,8) 10(2,3) | 4 | 4 | 71 | 32 | 10 | 17 |
| HD | 07.6N | 8 | 1000 | .. | .. | .. | .. | 09(5,6,7,8) | 4 | 4 | 91 | 16 | 09 | 23 |
| GU | 04.8N | 8 | 1443 | .. | .. | .. | .. | 09(5) | 5 | 10 | 90 | 30 | 10 | 19 |
| AN | 01.5N | 8 | 18-- | .. | .. | .. | .. | | - | 3 | 117 | 45 | 10 | 17 |
| TV | 01.1S | 8 | 18-- | .. | .. | .. | .. | | - | 3 | 152 | 81 | 10 | 17 |
| HU | 06.1S | 8 | 1155 | .. | .. | .. | .. | 09(5,6,7) | 5 | 6 | 250 | 40 | 10 | 21 |
| HR | 33.7S | 8 | 17-- | .. | .. | .. | .. | 09(5,6,8) | 5 | 19 | 92 | 93 | 10 | 09 |
| GN | 43.3S | 8 | 16-- | .. | .. | .. | .. | 09(5,6,8) | 5 | 19 | 70 | 90 | 10 | 19 |
| TO | 46.7S | 8 | 21-- | .. | .. | .. | .. | 09(5,6) | 5 | 18 | 131 | 22 | 10 | 18 |
| HD | 07.6N | 19 | 1400 | .. | .. | .. | .. | 19(7) 20(1,7,8) | 3 | 2 | 81 | 9 | 20 | 23 |
| HD | 07.6N | 23 | 0530 | .. | .. | .. | .. | 23(7) | 4 | 2 | 102 | 9 | 24 | 22 |
| NE | 55.1N | 27 | 0608 | .. | 0.5 | 13 | .. | 29(1) | 5 | 21 | 62 | 84 | 29 | 09 |
| JP | 17.3N | 27 | 0607 | SC | - 0.9 | 21 | - 5 | | - | 4 | 92 | 30 | 28 | 01 |
| SH | 14.6N | 27 | 0607 | SC | - 0.2 | 20 | 4 | | - | 3 | 69 | 26 | 28 | 01 |
| UJ | 13.5N | 27 | 0607 | SC | - 0.6 | 27 | - 7 | | - | 3 | 106 | 26 | 28 | 01 |
| AL | 09.5N | 27 | 0607 | SC | - 0.7 | 21 | - 7 | 27(3) | 5 | 3 | 88 | 26 | 28 | 01 |
| HD | 07.6N | 27 | 0608 | SC | - 0.5 | +24 | - 2 | 27(3) | 4 | 4 | 111 | 14 | 28 | 03 |
| AN | 01.5N | 27 | 0607 | SC | - 1.2 | 40 | 5 | | - | -- | 125 | 10 | 28 | 01 |
| TV | 01.1S | 27 | 0607 | SC | 0.3 | 42 | 46 | | - | 2 | 161 | 104 | 28 | 01 |
| KG | 56.5S | 27 | 0607 | SC | .. | .. | .. | 28(8) | 5 | -- | -- | -- | 29 | 06 |
| HD | 07.6N | 28 | 2100 | .. | .. | .. | .. | 28(8) 29(2,6,7) | 3 | 3 | 78 | 16 | 29 | 21 |
| GU | 04.8N | 28 | 2050 | .. | .. | .. | .. | 29(2) | 5 | 0 | 60 | 20 | 29 | 20 |

Reports were received from the following observatories:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| College | Witteveen | Tucson | Jaipur | Alibag | Annamalaingar | Port Moresby | Toolangi |
| Sitka | Fredericksburg | San Juan | Shillong | Hyderabad | Huancayo | Hermanus | Port-aux-Francais |
| Newport | Boulder | Honolulu | Ujjain | Guam | Trivandrum | Gnangara | |

# SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

## MARCH 1977

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romana)
The meaning of the station sumbols is given in the IAGA-Bulletin nr. 32.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc)

27 0607 A: LM; B: SO VI LG KS; C: WI EB TL SZ KG (si: B: DU - psc: FU)

Solar-flare effects (sfe)
Effects confirmed by ionospheric or solar observations are underlined.

None

Very unusual events

01 2056 bp: LG (‡) TL (‡) - bps: SO (∓) HB; C: WI (‡)

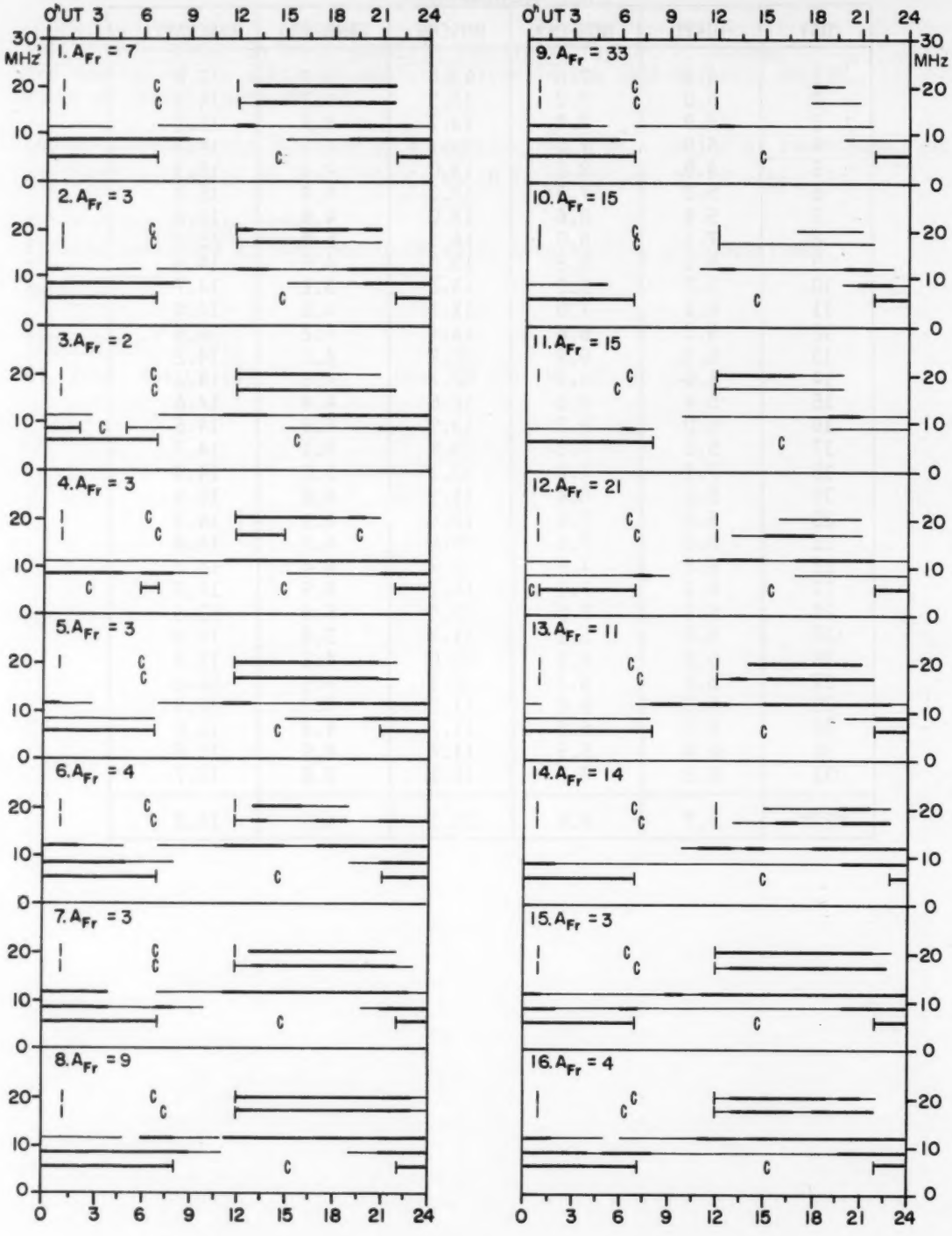
# RADIO PROPAGATION QUALITY INDICES

## MARCH 1977

| DAY | TOKYO | NORFOLK | MOSCOW | CANBERRA | BRACKNELL |
|---|---|---|---|---|---|
| 1 | 4.8 | 7.8 | 13.4 | 5.7 | 15.0 |
| 2 | 5.0 | 7.2 | 13.3 | 4.7 | 14.8 |
| 3 | 4.9 | 7.4 | 13.7 | 4.9 | 15.1 |
| 4 | 5.0 | 7.0 | 13.1 | 4.4 | 14.8 |
| 5 | 4.9 | 8.2 | 13.0 | 4.3 | 15.3 |
| 6 | 5.2 | 7.3 | 13.3 | 4.4 | 15.1 |
| 7 | 5.4 | 8.6 | 13.9 | 4.9 | 15.4 |
| 8 | 7.1 | 8.0 | 14.1 | 5.9 | 15.2 |
| 9 | 5.5 | 5.8 | 13.2 | 4.6 | 14.9 |
| 10 | 5.2 | 6.0 | 13.8 | 5.1 | 14.7 |
| 11 | 6.1 | 7.0 | 13.1 | 4.5 | 14.4 |
| 12 | 5.5 | 6.6 | 13.4 | 4.2 | 14.6 |
| 13 | 5.3 | 6.9 | 12.9 | 4.2 | 14.2 |
| 14 | 5.0 | 6.5 | 12.7 | 4.6 | 14.3 |
| 15 | 5.4 | 8.3 | 12.6 | 4.4 | 14.6 |
| 16 | 6.0 | 8.2 | 13.9 | 4.6 | 14.6 |
| 17 | 5.2 | 7.8 | 13.9 | 4.1 | 14.7 |
| 18 | 7.1 | 7.8 | 13.3 | 5.0 | 14.9 |
| 19 | 6.0 | 8.4 | 13.3 | 4.8 | 15.0 |
| 20 | 5.8 | 7.9 | 13.4 | 4.1 | 14.3 |
| 21 | 6.5 | 7.5 | 13.8 | 4.2 | 14.4 |
| 22 | 6.5 | 7.5 | 13.9 | 4.4 | 14.7 |
| 23 | 6.3 | 7.1 | 14.1 | 4.9 | 14.8 |
| 24 | 6.3 | 5.0 | 12.4 | 5.0 | 12.6 |
| 25 | 4.8 | 5.1 | 11.3 | 3.8 | 12.4 |
| 26 | 5.0 | 4.5 | 11.6 | 4.1 | 12.4 |
| 27 | 6.9 | 6.3 | 12.1 | 4.9 | 12.6 |
| 28 | 5.3 | 5.0 | 11.5 | 4.3 | 12.5 |
| 29 | 5.7 | 6.2 | 11.7 | 4.3 | 12.6 |
| 30 | 6.4 | 5.5 | 11.7 | 4.9 | 12.6 |
| 31 | 6.3 | 6.7 | 12.1 | 3.6 | 12.7 |
| MEAN | 5.7 | 6.9 | 13.0 | 4.6 | 14.2 |

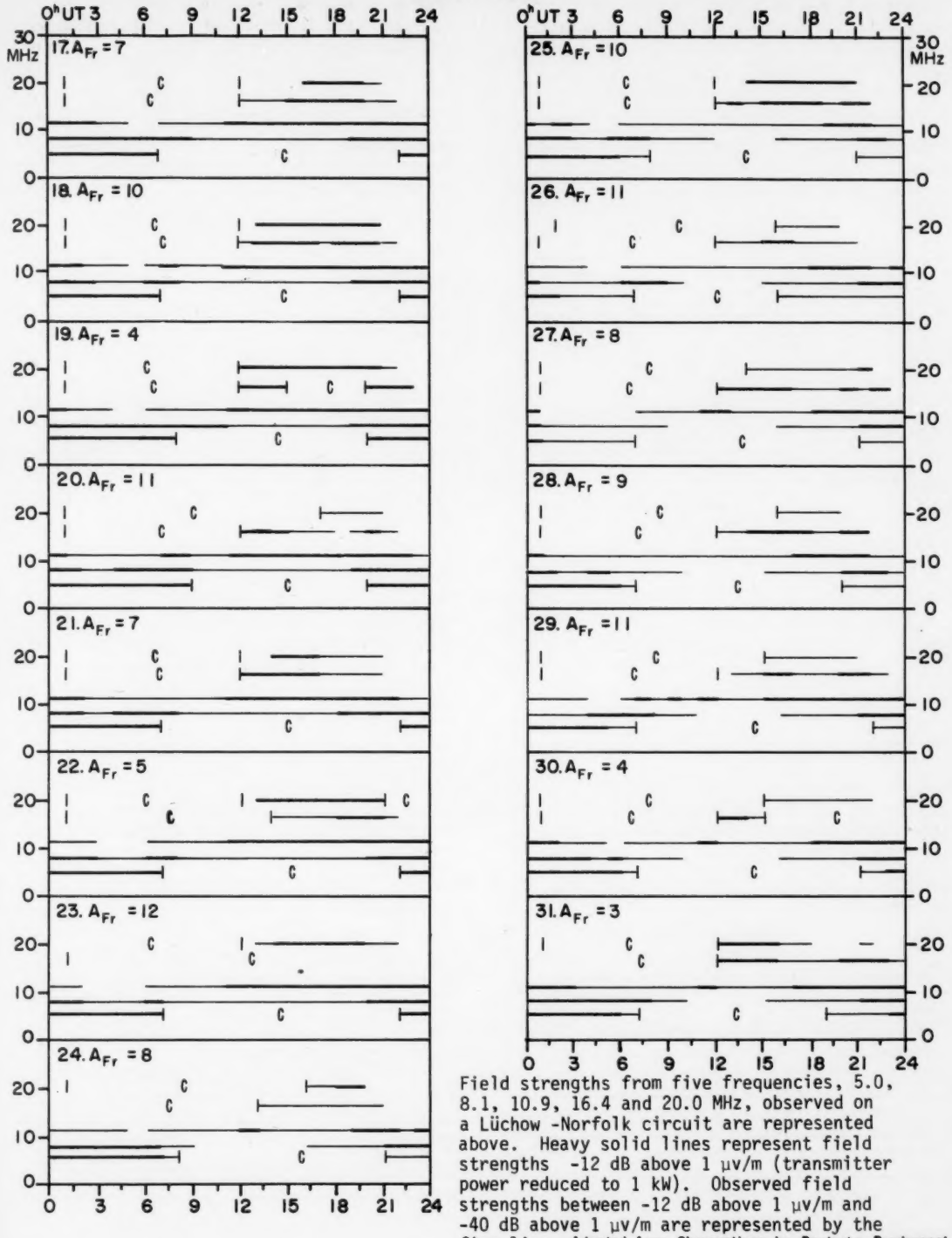
# TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

MARCH 1977



# TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

MARCH 1977




Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow -Norfolk circuit are represented above. Heavy solid lines represent field strengths -12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line. **Adapted from Observations by Deutsche Bundespost**

USCOMM-NOAA-ASHEVILLE, NC--5-31-77--950

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No393 pt2

May 1977 Number 393-Part II

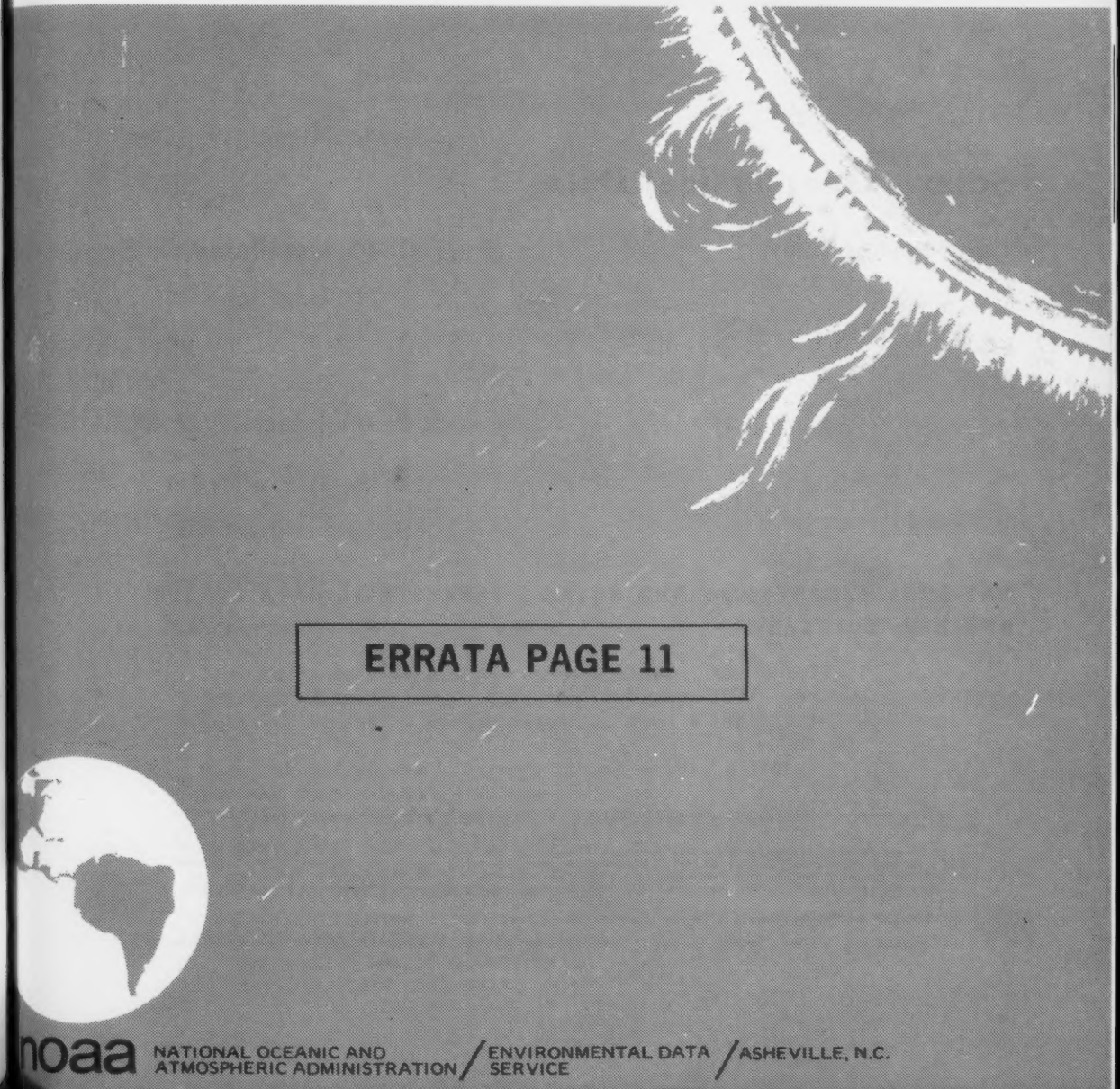
P-A STACKS

JUN 1977

# Solar-Geophysical Data comprehensive reports

Data for November 1976–October 1976 & Miscellanea

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977



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U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Robert M. White. Administrator
ENVIRONMENTAL DATA SERVICE
Thomas S. Austin, Director

# Solar - Geophysical Data

NO. 393 MAY 1977

## Part II (Comprehensive Reports)

DATA FOR
NOVEMBER 1976
OCTOBER 1976
& MISCELLANEA

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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To standardize referencing these reports in the open literature, the following format is recommended:

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# SOLAR - GEOPHYSICAL DATA

No. 393

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

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Note: A = Part I, B = Part II.

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ACTIVE REGIONS

CARRINGTON ROTATION 1647

(October 10 - November 7, 1976)

| Region No. | Coordinates | | Age at CMP | IMP. | Spot-less Region | Region No. in Rotation 1646 | Activity at West Limb |
|---|---|---|---|---|---|---|---|
| | Lat. | Long. | | | | | |
| 1 | 26°N | 309° | >6 | 1 | x | | decreasing |
| 2 | 28 S | 288 | +4 | 4 | | | decreasing |
| 3 | 10 S | 265 | >6 | 2 | | | |
| 4 | 22 N | 234 | -3 | 1 | x | | disappeared |
| 5 | 24 S | 211 | >6 | 1 | x | | decreasing |
| 6 | 29 N | 191 | +2 | 4 | | | decreasing |
| 7 | 6 N | 176 | +6 | 1 | x | | disappeared |
| 8 | 18 N | 128 | >6 | 1 | x | (11) | dispersed |
| 9 | 29 S | 121 | +5 | 2 | | | decreasing |

ACTIVE REGIONS

CARRINGTON ROTATION 1648

(November 7 - December 4, 1976)

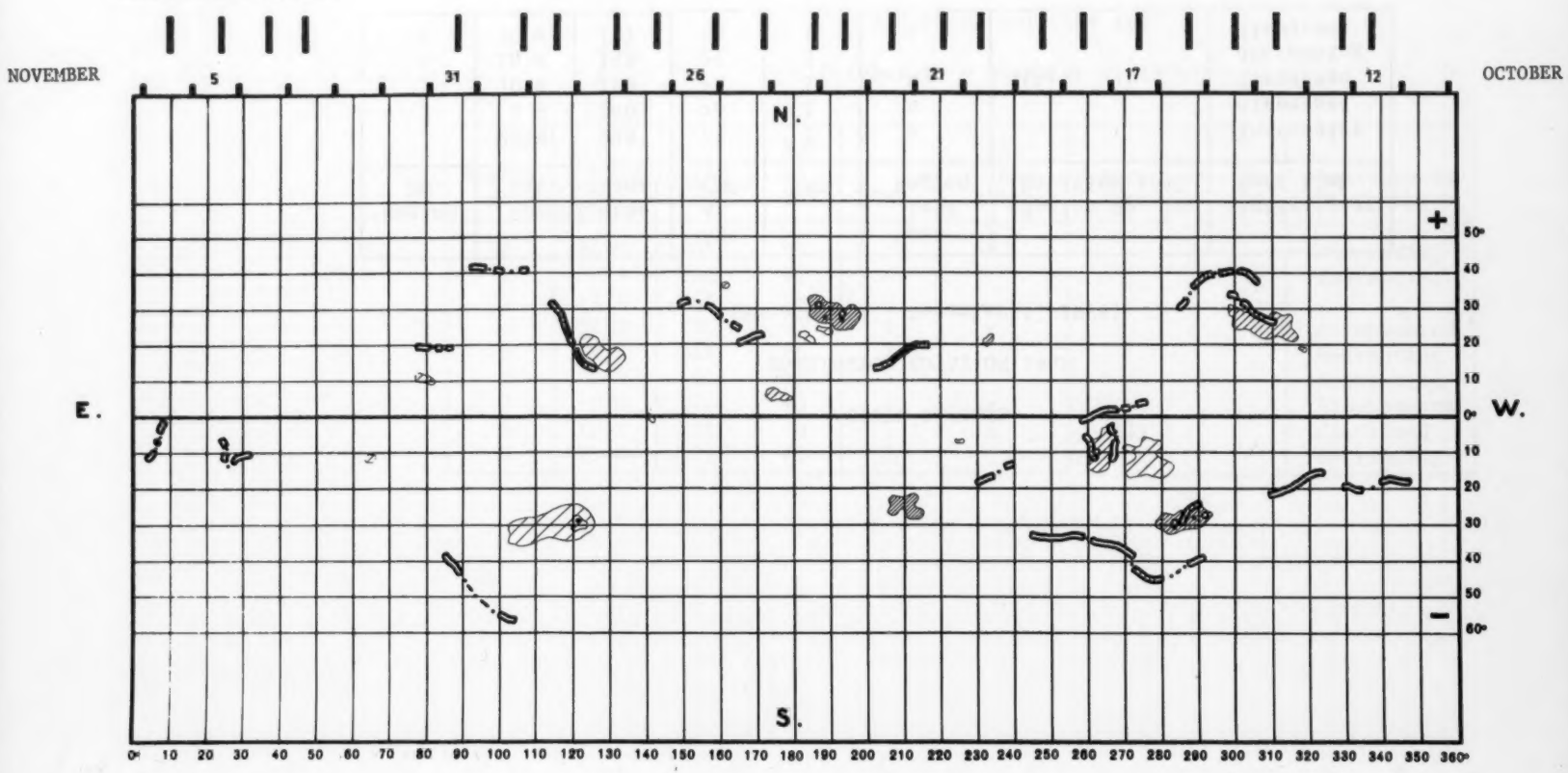
| Region No. | Coordinates | | Age at CMP | IMP. | Spot-less Region | Region No. in Rotation 1647 | Activity at West Limb |
|---|---|---|---|---|---|---|---|
| | Lat. | Long. | | | | | |
| 1 | 22°N | 295° | -4 | 1 | x | | increasing |
| 2 | 5 S | 240 | >6 | 1 | x | | dispersed |
| 3 | 30 N | 183 | >6 | 1 | x | (6) | dispersed |
| 4 | 10 N | 145 | >6 | 3 | | | decreasing |
| 5 | 30 N | 127 | >6 | 1 | x | | dispersed |

# SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1647

OCTOBER 10 TO NOVEMBER 7, 1976

MEUDON OBSERVATORY

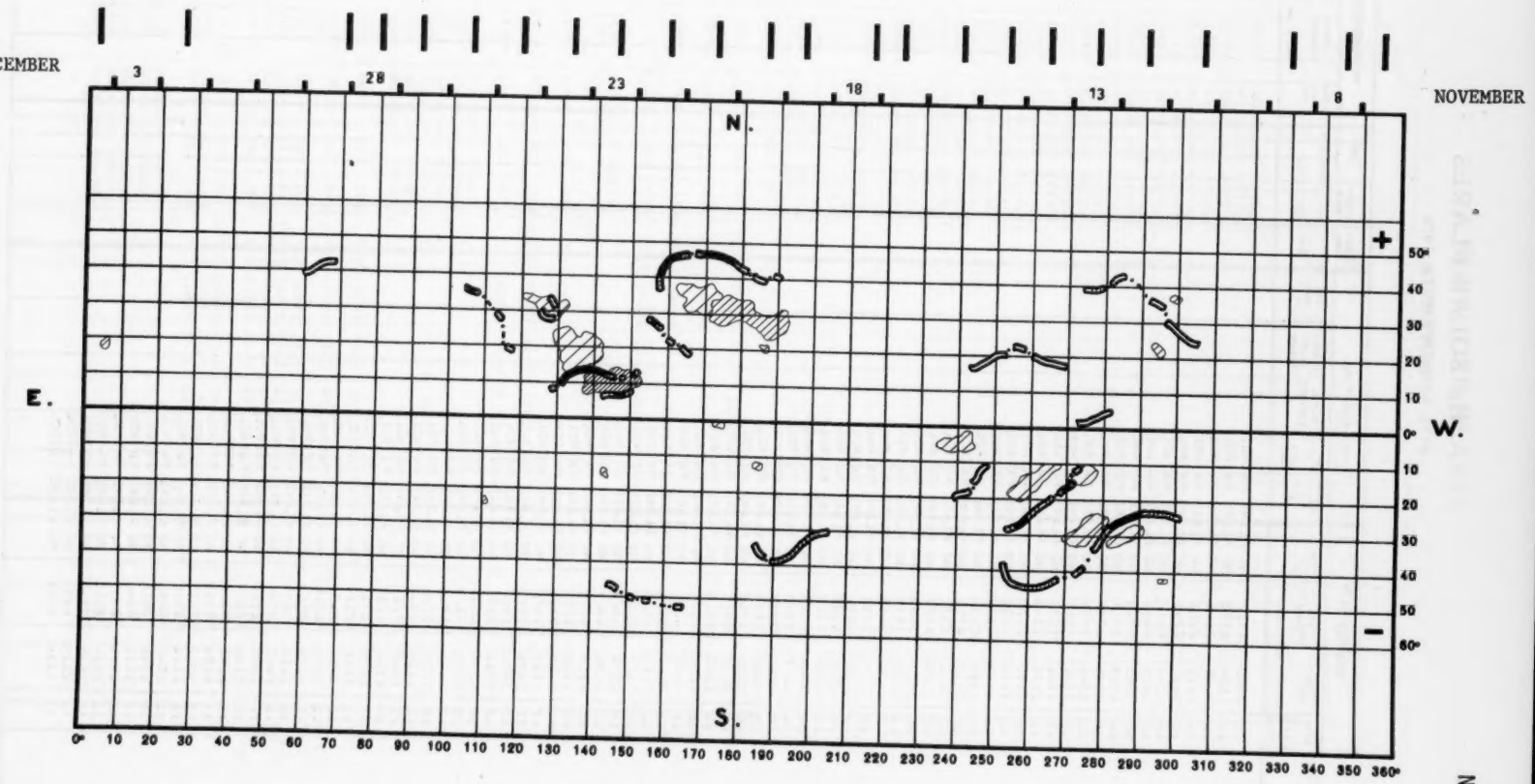


# SYNOPTIC SOLAR MAP

## CARRINGTON ROTATION 1647

NOVEMBER 7 TO DECEMBER 4, 1976

MEUDON OBSERVATORY




7 Nov 76

# Hα SOLAR FLARES

## NOVEMBER 1976

| OBSERVATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION | IMPORTANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE 1976 NOV | START | MAX. PHASE | END | APPROX LAT. | APPROX HGR. LONG. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP DAY | MIN. | | CONF. | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg. | |
| | 01 | 0056 | 0127 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 01 | 1124 | 1132 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 01 | 2125 | 2146 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 01 | 2218 | 2310 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 0231 | 0242 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 0248 | 0602 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 0618 | 0634 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 0655 | 0705 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 0905 | 0915 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 0925 | 0935 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1048 | 1055 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1100 | 1115 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1120 | 1126 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1135 | 1145 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1215 | 1225 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1420 | 1431 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 1519 | 1636 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 2035 | 2050 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 2112 | 2253 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 2256 | 2331 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 02 | 2334 | 0025 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 03 | 1510 | 1603 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 03 | 1618 | 1636 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 03 | 1650 | 1659 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 03 | 2107 | 2328 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 03 | 2332 | 0000 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 04 | 0226 | 0237 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 04 | 0248 | 0315 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 04 | 1744 | 1803 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 04 | 1833 | 1907 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 05 | 0227 | 0235 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 05 | 1608 | 1620 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 05 | 1626 | 1742 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 05 | 2010 | 2016 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 05 | 2045 | 0015 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 06 | 0020 | 0103 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 06 | 0112 | 0250 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 06 | 2010 | 2051 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 06 | 2114 | 2125 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 06 | 2129 | 2204 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 06 | 2209 | 0115 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 0130 | 0315 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 0319 | 0320 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 1540 | 1655 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 1658 | 1837 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 1839 | 1852 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 1856 | 1919 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 1934 | 1954 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 07 | 2020 | 2033 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 08 | 0126 | 0131 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 08 | 0200 | 0309 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 08 | 1640 | 1701 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 08 | 1755 | 1756 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 08 | 1818 | 1841 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 08 | 1947 | 2055 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 09 | 0215 | 0231 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 09 | 0255 | 0311 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 09 | 2102 | 2210 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 0429 | 0438 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 0514 | 0544 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 0600 | 0613 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 1618 | 1635 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 1645 | 1750 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 1841 | 2233 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 2348 | 0237 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0248 | 0253 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0259 | 0307 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0350 | 0432 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0504 | 0506 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0546 | 0555 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0608 | 0616 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0631 | 0644 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 0905 | 0917 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 2024 | 2043 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 2045 | 2210 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 11 | 2229 | 0233 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 12 | 0234 | 0241 | NO FLARE PATROL | | | | | | | | | | | | | |

# Hα SOLAR FLARES

## NOVEMBER 1976

| OBSERVATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION | IMPORTANCE | OBS. | | MEASUREMENTS | | | REMARKS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE 1976 NOV | START | MAX. PHASE | END | APPROX LAT. | APPROX MER. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP. DAY | MIN. | | CONC | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg | | |
| | 12 | 0242 | 0333 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 1655 | 1711 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 1713 | 1730 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 1813 | 1822 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 1833 | 1901 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 1911 | 2123 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 2142 | 2153 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 2159 | 2212 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 12 | 2220 | 2240 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 13 | 0205 | 0226 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 13 | 0234 | 0318 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 13 | 2029 | 2035 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 13 | 2038 | 2201 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 13 | 2204 | 2243 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 13 | 2252 | 2335 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 1940 | 2234 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 1943 | 1956 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 2026 | 2103 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 2114 | 2225 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 2233 | 2300 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 2305 | 2325 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 2347 | 2356 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 0003 | 0011 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 0013 | 0018 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 0118 | 0133 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 0135 | 0139 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 0157 | 0228 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 0234 | 0328 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 16 | 2102 | 2344 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 17 | 0124 | 0138 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 17 | 0144 | 0152 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 17 | 0215 | 0351 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 626 CULG | 17 | 0226 | 0233 | 0242 | N10 | E90 | 1.000 | 14528 | 23.9 | 16 | -F | | C | 0234 | 40 | | | Y5 |
| 627 HTPR | 17 | 1038 | 1044 | 1048 | N14 | E80 | .984 | 14528 | 23.4 | 10 | -F | | C | 1044 | 40 | | D | Y5 |
| 628 HTPR | 17 | 1115 | 1117 | 1124 | N22 | W72 | .953 | 14518 | 12.1 | 9 | -F | | C | 1117 | 20 | | E | Y5 |
| 629 RAMY | 17 | 1845 | | 1906 | N13 | E79 | .981 | 14528 | 23.7 | 21 | -F | 4 | C | | | | DE | Y5 |
| | 18 | 0204 | 0428 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 18 | 0440 | 0614 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 630 HTPR | 18 | 0713 | 0724 | 0800 | N23 | W85 | .995 | 14518 | 11.9 | 47 | -F | | C | 0724 | 40 | | D | Y5 |
| 631 HTPR | 18 | 1515 | 1518 | 1541D | N23 | W90 | 1.000 | 14518 | 11.9 | 26D | -N | | C | 1518 | 20 | | E | Y5 |
| 632 RAMY | 18 | 1730 | 1736U | 1742 | N13 | E55 | .823 | 14528 | 22.9 | 12 | -F | 4 | C | | 79 | | | Y5 |
| | 18 | 1916 | 1946 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 18 | 2000 | 2009 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 18 | 2013 | 2307 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 18 | 2310 | 0338 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 0443 | 0452 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 0513 | 0532 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 633 HTPR | 19 | 0952 | 1003 | 1040 | N13 | E50 | .772 | 14528 | 23.2 | 48 | -F | | C | 1003 | 40 | .6 | E | Y5 |
| GRP63634 | 19 | 1500>9 | 1515+1 1522+2 | 1535 | N12 | E49 | .760 | 14528 | 23.3 | 35 | -N | | | | | | HKR | |
| RAMY | 19 | 1500 | 1522 | 1534 | N13 | E49 | .762 | 14528 | 23.3 | 34 | -N | 4 | C | | 141 | | F R | |
| MCMA | 19 | 1502 | 1516 | 1540 | N12 | E48 | .749 | 14528 | 23.2 | 38 | -N | | C | 1516 | 40 | .6 | EH | |
| HTPR | 19 | 1510 | 1515 | 1527 | N13 | E50 | .772 | 14528 | 23.4 | 17 | -N | | C | 1515 | 80 | 1.2 | E,K | |
| RAMY | 19 | 1515E | 1524U | 1535D | N12 | E59 | .859 | 14528 | 24.1 | 20D | -N | 4 | V | | 159 | | F R | |
| GRP63635 | 19 | 1603+0 | 1605+2 | 1617 | N11 | E47 | .736 | 14528 | 23.2 | 14 | -N | | | | 70 | 1.0 | EH | |
| RAMY | 19 | 1603 | 1607 | 1611D | N12 | E49 | .760 | 14528 | 23.3 | 8D | -N | 4 | C | | 88 | | DE | |
| MCMA | 19 | 1603 | 1605 | 1617 | N10 | E46 | .723 | 14528 | 23.1 | 14 | -N | | C | 1605 | 50 | .7 | EH | |
| | 19 | 1936 | 1946 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 1956 | 2250 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 2258 | 2355 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 20 | 0302 | 0310 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 20 | 0312 | 0325 | NO FLARE PATROL | | | | | | | | | | | | | | |

# Hα SOLAR FLARES

## NOVEMBER 1976

| OBSERV-ATORY | OBSERVED UT | | | | LOCATION | | | | | DURA-TION | IMPOR-TANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | APPROX | | | | | | | | | | | | |
| | DATE 1976 NOV | START | MAX. PHASE | END | LAT. | MER. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP. DAY | MIN. | | CONF. | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR. AREA Sq. Deg. | |
| GRP63636 | 20 | 1230E | 1240+1 | 1248D | N12 | E34 | .574 | 14528 | 23.1 | 18 | -N | | | | 100 | 1.2 | FR |
| RAMY | 20 | 1230E | 1240 | 1248D | N12 | E36 | .601 | 14528 | 23.2 | 18D | -N | 4 | C | | 95 | | F R |
| RAMY | 20 | 1235E | 1241U | 1246D | N13 | E33 | .564 | 14528 | 23.0 | 13D | -N | 4 | V | | 95 | | F R |
| GRP63637 | 20 | 1250E | 1254+2 | 1258D | N13 | E41 | .668 | 14528 | 23.6 | 8 | -F | | | | 50 | .7 | R |
| RAMY | 20 | 1250E | 1256 | 1258D | N13 | E41 | .668 | 14528 | 23.6 | 8D | -F | 4 | C | | 47 | | R |
| RAMY | 20 | 1250E | 1254 | 1258D | N14 | E41 | .671 | 14528 | 23.6 | 8D | -F | 4 | V | | 47 | | R |
| | 20 | 1630 | 1652 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 1656 | 1704 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 1817 | 2330 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 0135 | 0145 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 0212 | 0307 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 0323 | 0328 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 1545 | 1617 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 1620 | 1815 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 1830 | 2021 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 2257 | 2313 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 2330 | 2355 | NO FLARE PATROL | | | | | | | | | | | | | |
| 638 CULG | 22 | 0232 | 0235 | 0249 | N11 | E21 | .386 | 14528 | 23.7 | 17 | -F | | C | 0240 | 40 | | E Y5 |
| | 22 | 1646 | 1654 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 1656 | 1753 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 2205 | 2226 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 2304 | 0113 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 0119 | 0140 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 0145 | 0208 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 0245 | 0332 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 0407 | 0442 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 0621 | 0632 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 0806 | 0821 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 2126 | 2346 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 2349 | 0006 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0102 | 0116 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0147 | 0155 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0159 | 0202 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0215 | 0220 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0253 | 0312 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0317 | 0322 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0532 | 0606 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 1023 | 1121 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 1144 | 1210 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 1220 | 1234 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 2059 | 2357 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 2400 | 0511 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 25 | 0525 | 0544 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 25 | 1923 | 2340 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 25 | 2349 | 0015 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 1544 | 1714 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 1722 | 1831 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 2111 | 2356 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 2400 | 0241 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 0246 | 0434 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 0447 | 0705 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 1451 | 1513 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 1634 | 1642 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 2006 | 2032 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 2041 | 0034 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 28 | 0038 | 0054 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 28 | 1945 | 2223 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 28 | 2319 | 2340 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 0020 | 0022 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 0311 | 0325 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 0524 | 0546 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 0623 | 0628 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 1455 | 1611 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 1640 | 1709 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 2105 | 2310 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 2325 | 2335 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 29 | 2349 | 0030 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 0019 | 0045 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 0054 | 0144 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 0154 | 0231 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 0235 | 0331 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 1202 | 1307 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 1310 | 1426 | NO FLARE PATROL | | | | | | | | | | | | | |

# Hα SOLAR FLARES

## NOVEMBER 1976

| OBSERV-ATORY | OBSERVED UT | | | | LOCATION | | | | | DURA-TION | IMPOR-TANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE 1976 NOV | START | MAX. PHASE | END | APPROX LAT. | APPROX MER. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMR DAY | MIN. | | CONO | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg | |
| | 30 | 1506 | 1554 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 1555 | 1634 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 1649 | 1808 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 1832 | 1837 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 30 | 2016 | 0000 | NO FLARE PATROL | | | | | | | | | | | | | |

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium $D_3$ in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

## DAILY FLARE INDICES

Includes all Flares

NOVEMBER 1976

| Date | Flare Index | HR. OBS. | Date | Flare Index | HR. OBS. | Date | Flare Index | HR. OBS. |
|---|---|---|---|---|---|---|---|---|
| 761101 | 0.00 | 22.1 | 761111 | 0.00 | 16.6 | 761121 | 0.00 | 17.9 |
| 761102 | 0.00 | 14.2 | 761112 | 0.00 | 18.9 | 761122 | 5.92 | 20.4 |
| 761103 | 0.00 | 19.9 | 761113 | 0.00 | 20.1 | 761123 | 0.00 | 18.8 |
| 761104 | 0.00 | 22.5 | 761114 | 0.00 | 21.1 | 761124 | 0.00 | 12.8 |
| 761105 | 0.00 | 18.8 | 761115 | 0.00 | 21.1 | 761125 | 0.00 | 19.0 |
| 761106 | 0.00 | 17.1 | 761116 | 0.00 | 19.4 | 761126 | 0.00 | 15.9 |
| 761107 | 0.00 | 18.2 | 761117 | 3.58 | 22.0 | 761127 | 0.00 | 15.1 |
| 761108 | 0.00 | 20.9 | 761118 | 6.54 | 12.0 | 761128 | 0.00 | 20.8 |
| 761109 | 0.00 | 22.3 | 761119 | 7.46 | 19.5 | 761129 | 0.00 | 19.1 |
| 761110 | 0.00 | 14.4 | 761120 | 8.33 | 17.9 | 761130 | 0.00 | 12.3 |

When no Flare Index is given, it is 0 for that day.

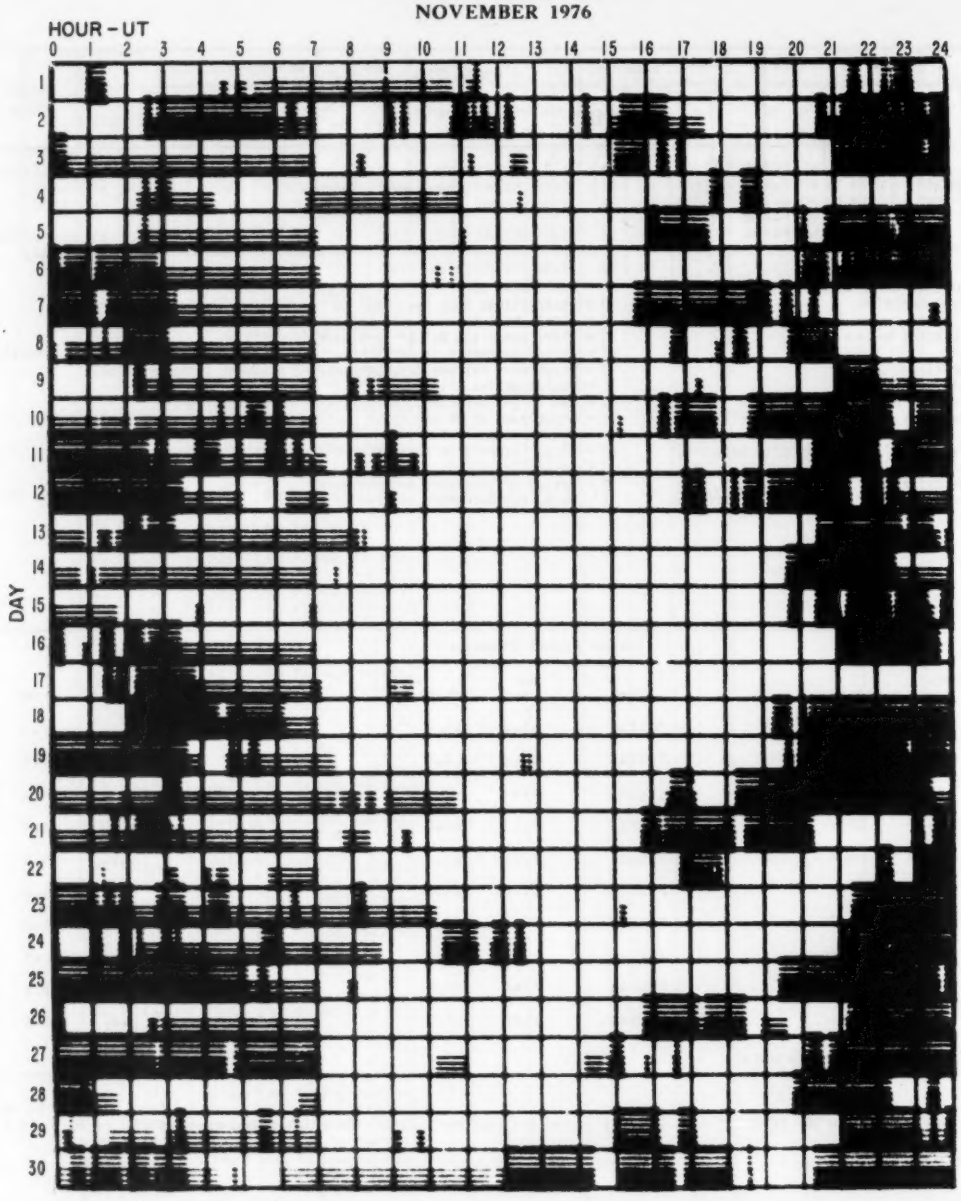
Errata: The data for Oct. 1976 in SGD issue 392 Part II p. 12 lacked the last day's data. The missing data are:

| Date | Flare Index | HR OBS. |
|---|---|---|
| 761031 | 0.00 | 15.5 |

# INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

## NOVEMBER 1976




Observatories included in total patrol:

| | | | | |
|---|---|---|---|---|
| Athenes | Haute Provence | Istanboul | McMath-Hulbert | Ramey |
| Bucharest | Herstmonceux | Kodaikanal | Mitaka | Tehran |
| Catania | Huancayo | Locarno | Monte Mario | Upice |
| Culgoora | Hurbanovo | Manila | Palehua | Wendelstein |
| | | | | Zürich |

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

# SOLAR RADIO EMISSION
# OUTSTANDING OCCURRENCES
## NOVEMBER 1976

| NOV 1976 | FREQUENCY | STATION | TYPE | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 260 | ONDR | 8 S | 1036.3 | 1036.3 | 0.3 | 6 | | | |
| 2 | 207 | VORO | 4 S/F | 0039 | 0039.5 | 1 | 160 | | | |
| | 9240 | ARCE | 4 S/F | 0815.3 | 0817.2 | 3 | | | | |
| | 9240 | ARCE | 1 S | 0815.7 | 0815.9 | 0.8 | | | | |
| 4 | 930 | BORD | 8 S | 0740.8 | 0740.8 | 0.1 | 10 | 2 | | |
| 5 | 930 | BORD | 8 S | 0805.8 | 0805.8 | 0.1 | 8 | 1 | | |
| | 930 | BORD | 8 S | 0918.7 | 0918.7 | 0.1 | 12 | 1 | | |
| | 930 | BORD | 8 S | 1428.2 | 1428.2 | 0.1 | 8 | 1 | | |
| | 930 | BORD | 41 F | 1435 | 1435.3 | 2 | 17 | 2 | | |
| 6 | 260 | ONDR | 2 S/F | 1134.5 | 1135 | 0.8 | 10 | | | |
| | 536 | ONDR | 8 S | 1313.3 | 1313.3 | 0.3 | 11 | | | |
| 9 | 9240 | ARCE | 4 S/F | 0845.7 | 0845.8 | 0.8 | | | | |
| | 9240 | ARCE | 2 S/F | 0908.3 | 0908.8 | 1.5 | | | | |
| 10 | 3100 | CRIM | 2 S/F | 1144 | 1146 | 6 | 8 | 3 | | |
| | 260 | ONDR | 8 S | 1248.2 | 1248.2 | 0.3 | 15 | | | |
| 11 | 536 | ONDR | 8 S | 1244.2 | 1244.2 | 0.3 | 36 | | | |
| 12 | 9240 | ARCE | 40 F | 0809.8 | 0812.2 | 4.5 | | | | |
| | 9240 | ARCE | 45 C | 0824.6 | 0825 | 3 | | | | |
| | 9240 | ARCE | 40 F | 1103.7 | 1105.5 | 19.6 | | | | |
| | 3100 | CRIM | 2 S/F | 1104 | 1105 | 6 | 9 | 3 | | |
| 13 | 9240 | ARCE | 4 S/F | 0814.6 | 0815.1 | 1.4 | | | | |
| 15 | 930 | BORD | 8 S | 1335.7 | 1335.7 | 0.1 | 12 | 1 | | |
| 16 | 9240 | ARCE | 20 GRF | 0739.9 | 0853.4 | 227 | | | | |
| 17 | 930 | BORD | 8 S | 0830.8 | 0830.8 | 0.1 | 12 | 1 | | |
| | 2800 | OTTA | 32 ABS | 2037 | 2046 | 63 | -2.2 | -1.1 | | |
| 18 | 207 | VORO | 4 S/F | 0129 | 0130 | 2 | 36 | | | |
| | 207 | VORO | 4 S/F | 0202 | 0203 | 1 | 28 | | | |
| | 207 | VORO | 4 S/F | 0205 | 0206 | 1.5 | 158 | | | |
| | 127 | TORN | 45 C | 0801 | 0801.8 | 6.7 | 70 | 4 | | |
| | 260 | ONDR | 1 S | 0934.3 | 0934.3 | 0.2 | 3.5 | | | |
| | 260 | ONDR | 4 S/F | 1012.4 | 1012.8 | 0.5 | 21 | | | |
| | 228 | HARS | 48 C | 1141.2 | 1142.5 | 2.7 | 80 U | 30 U | | |
| | 260 | ONDR | 45 C | 1141.4 | 1142.3 | 3 | 18 | 5 | | |
| | 808 | ONDR | 1 S | 1143.7 | 1143.7 | 0.2 | 5 | | | |
| | 536 | ONDR | 2 S/F | 1143 | 1143.8 | 1.5 | 5.6 | | | |
| | 808 | ONDR | 1 S | 1234.4 | 1234.4 | 0.2 | 4 | | | |
| | 536 | ONDR | 1 S | 1234.6 | 1234.6 | 0.2 | 2 | | | |
| | 260 | ONDR | 1 S | 1235 | 1235 | 0.2 | 2.5 | | | |
| | 260 | ONDR | 45 C | 1335.2 | 1336 | 4 | 10 | 3 | | |
| | 2695 | PENT | 20 GRF | 2116 | 2127 | 35 | 1.4 | 0.7 | | |
| | 2695 | PENT | 1 S | 2235.5 | 2236.2 | 1.5 | 2 | 1 | | |
| | 207 | VORO | 44 NS | 2300 | | 240 | | 7 | | |
| 19 | 200 | HIRA | 45 C | 0050.9 | 0052 | 2.5 | 450 | 100 | | SL |
| | 207 | VORO | 45 C | 0051 | 0052 | 2 | 205 | | | |
| | 100 | HIRA | 45 C | 0051.5 | 0052.2 | 1 | 220 | 80 | | WL |
| | 500 | HIRA | 45 C | 0051.5 | 0052.3 | 1 | 12 | 5 | | SL |
| | 200 | HIRA | 45 C | 0253 | 0253.5 | 1.5 | 150 | 30 | | ML |
| | 500 | HIRA | 45 C | 0253 | 0253.7 | 1.5 | 6 | 2 | | ML |
| | 207 | VORO | 4 S/F | 0253 | 0253.5 | 1.5 | 135 | | | |
| | 260 | ONDR | 44 NS | 0810 E | | 379 D | 115 | 10 | | |
| | 100 | GORK | 43 NS | 1015 | | 68 | | 5 | | |
| | 245 | SGMR | 44 NS | 1145 E | 1315.2 | 568 D | 208.6 | | | |
| | 410 | SGMR | 44 NS | 1145 E | 1316.6 | 568 D | 92.8 | | | |
| | 606 | SGMR | 44 NS | 1145 E | 1313.1 | 568 D | 27.5 | | | |
| | 127 | TORN | 43 NS | 1155 U | 1325 U | 165 D | | | | |
| | 237 | TRST | 41 F | 0852.4 | 0852.5 | 0.6 | 120 | | | R |
| | 100 | GORK | 46 C | 0852.5 | 0853.1 | 1.4 | 40 D | | | |
| | 100 | GORK | | 0852.5 | 0853.7 | | 20 | | | |
| | 9240 | ARCE | 20 GRF | 0928 | 0929.1 | 7.5 | | | | |
| | 650 | GORK | 3 C | 0946.6 | 0946.8 | 0.4 | 16 | 5 | | |
| | 650 | GORK | 45 SF | 0957.7 | 0959.7 | 3.3 | 8.1 | 1.5 | | |
| | 950 | GORK | 1 S | 0958.1 | 0959 | 2 | 2 | 1 | | |
| | 100 | GORK | 46 C | 0958.6 | 0958.7 | 2.1 | 40 D | | | |
| | 100 | GORK | | 0958.6 | 0959.1 | | 40 D | | | |
| | 100 | GORK | | 0958.6 | 1000.1 | | 25 | | | |
| | 127 | TORN | 7 C | 0958.7 | 0959.2 | 2.8 | 27 | 9 | | |
| | 950 | GORK | 1 S | 1012.6 | 1012.7 | 0.3 | 1.3 | .6 | | |
| | 127 | TORN | 27 RF | 1012 U | 1048.3 | 46 U | 8.5 | 3.4 | | |
| | 127 | TORN | 8 S | 1044.3 | 1044.7 | 1 | 45 D | 20 U | | |
| | 536 | ONDR | 27 RF | 1140 | 1312.8 | 149 | 22 | 5 | | |

# SOLAR RADIO EMISSION
## OUTSTANDING OCCURRENCES

### NOVEMBER 1976

| NOV 1976 | FREQUENCY | STATION | TYPE | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | 234 | POTS | 45 C | 1204 | 1322 | 161 D | 70 | | | |
| | 113 | POTS | 45 C | 1212 | 1436 | 148 D | 200 | | | |
| | 2800 | OTTA | 22 GRF | 1302 | 1518 | 260 | 4.8 | 2.4 | | |
| | 1415 | SGMR | 46 C | 1305.9 | 1330.6 | 36.3 | 90 | 19.1 | | |
| | 1470 | POTS | 46 | 1305 | 1331 | 37 | 47 | | | |
| | 808 | ONDR | 27 RF | 1308 | 1323.2 | 62 | 25 | 10 | | |
| | 930 | BORD | 40 F | 1311 | 1328.8 | 122 | 62 | 10 | | |
| | 200 | HIRA | 44 NS | 2120 E | 0306 | 600 D | 60 | 10 | | SL |
| | 207 | VORO | 44 NS | 2300 | 0150 | 240 | 2.5 | 14 | | |
| | 1415 | SGMR | 46 C | | 1333.4 | | 95.4 | | | |
| 20 | 100 | GORK | 43 NS | 0619 | | 180 | | 5 | | |
| | 260 | ONDR | 44 NS | 0825 E | | 355 D | 9 | | | |
| | 245 | SGMR | 43 NS | 1823.5 | 1906.8 | 168.5D | 74.2 | | | |
| | 200 | HIRA | 44 NS | 2120 E | 2230 | 600 D | 130 | 10 | | SL |
| | 207 | VORO | 44 NS | 2300 | | 240 | | 11 | | |
| | 2695 | PENT | 20 GRF | 2128 | 2132 | 12 | 1.2 | 0.6 | | |
| 21 | 100 | GORK | 43 NS | 0618 | | 342 D | | 5 | | |
| | 127 | TORN | 44 NS | 0650 E | 1306.5 | 450 D | 58 D | | | |
| | 221 | ABST | 44 NS | 0731.5 | 0732.5 | 90 | 15 | | | |
| | 260 | ONDR | 44 NS | 0800 E | | 378 D | 34 | 3 | | |
| | 245 | SGMR | 44 NS | 1147 E | 1310.4 | 195.1D | 113.1 | | | |
| | 221 | ABST | 45 C | 0730.5 | 0732.5 | 2 | 36 | 14 | | |
| | 127 | TORN | 46 C | 0810.8 | 0815.3 | 6.5 | 150 D | 15 | | |
| | 127 | TORN | 45 C | 0831 | 0833 | 3.2 | 29 | 9 | | |
| | 127 | TORN | 7 C | 0957 | 0958 | 2.2 | 16 | 3.7 | | |
| | 207 | VORO | 42 SER | 2335 | 2348 | 20 | 19 | | | |
| 22 | 100 | GORK | 44 NS | 0600 E | | 360 D | | 5 | | |
| | 930 | BORD | 8 S | 0756.3 | 0756.3 | 0.1 | 10 | 1 | | |
| | 260 | ONDR | 42 SER | 0929 | 1020.8 | 107. | 7 | | | |
| | 9240 | ARCE | 2 S/F | 0933.6 | 0933.9 | 1 | | | | |
| | 930 | BORD | 3 S | 1239 | 1240.8 | 5 | 11 | 3 | | |
| 23 | 207 | VORO | 43 NS | 0120 | 0240 | 180 | 11 | 8 | | |
| | 3100 | CRIM | 2 S/F | 0705 | 0708 | 10 | 6 | 2 | | |
| | 260 | ONDR | 42 SER | 0750 | 0756 | 24 | 10 | | | |
| | 260 | ONDR | 42 SER | 1031 | 1048.8 | 26 | 8 | | | |
| | 260 | ONDR | 4 S/F | 1228.3 | 1229.2 | 1.5 | 35 | | | |
| | 207 | VORO | 42 SER | 2330 | 2338 | 17 | 35 | | | |
| 24 | 207 | VORO | 43 NS | 0150 | 0240 | 70 | 10 | 8 | | |
| | 260 | ONDR | 44 NS | 0755 E | | 379 D | 6 | | | |
| 25 | 3100 | CRIM | 2 S/F | 0749 | 0915 | | 2 | | | |
| | 1420 | ARCE | 20 GRF | 0826.2 | 0834 | 13.5 | | | | |
| | 9240 | ARCE | 40 F | 0829.1 | 0829.3 | 4 | | | | |
| | 9240 | ARCE | 40 F | 0914 | 0917 | 6.5 | | | | |
| 26 | 260 | ONDR | 42 SER | 0800 | | 22 | 5 | | | |
| | 260 | ONDR | 43 NS | 1104 | 1259.5 | 186 D | 20 | | | |
| 28 | 18 | MCMA | 6 S | 1632 | 1633 | 2 | | | | |
| 29 | 9240 | ARCE | 3 S | 1101.6 | 1102 | 0.7 | | | | |

Reports received from the following observatories:

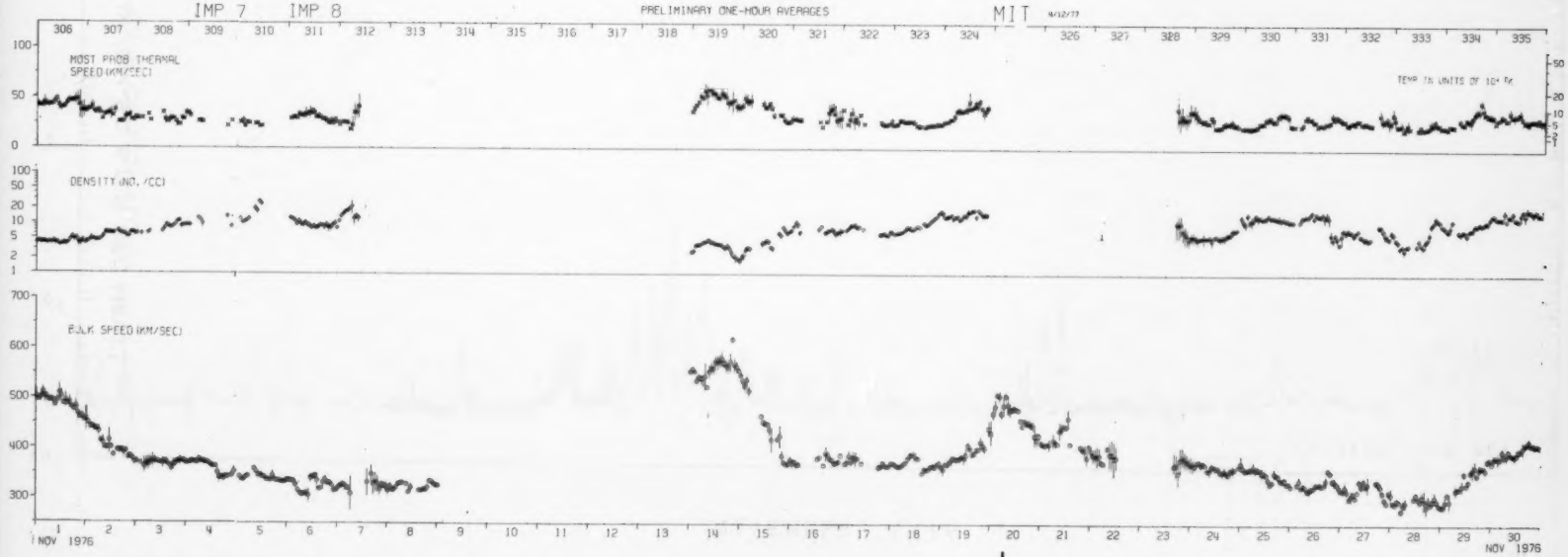
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

## IMP 7 AND 8 SOLAR WIND PLASMA

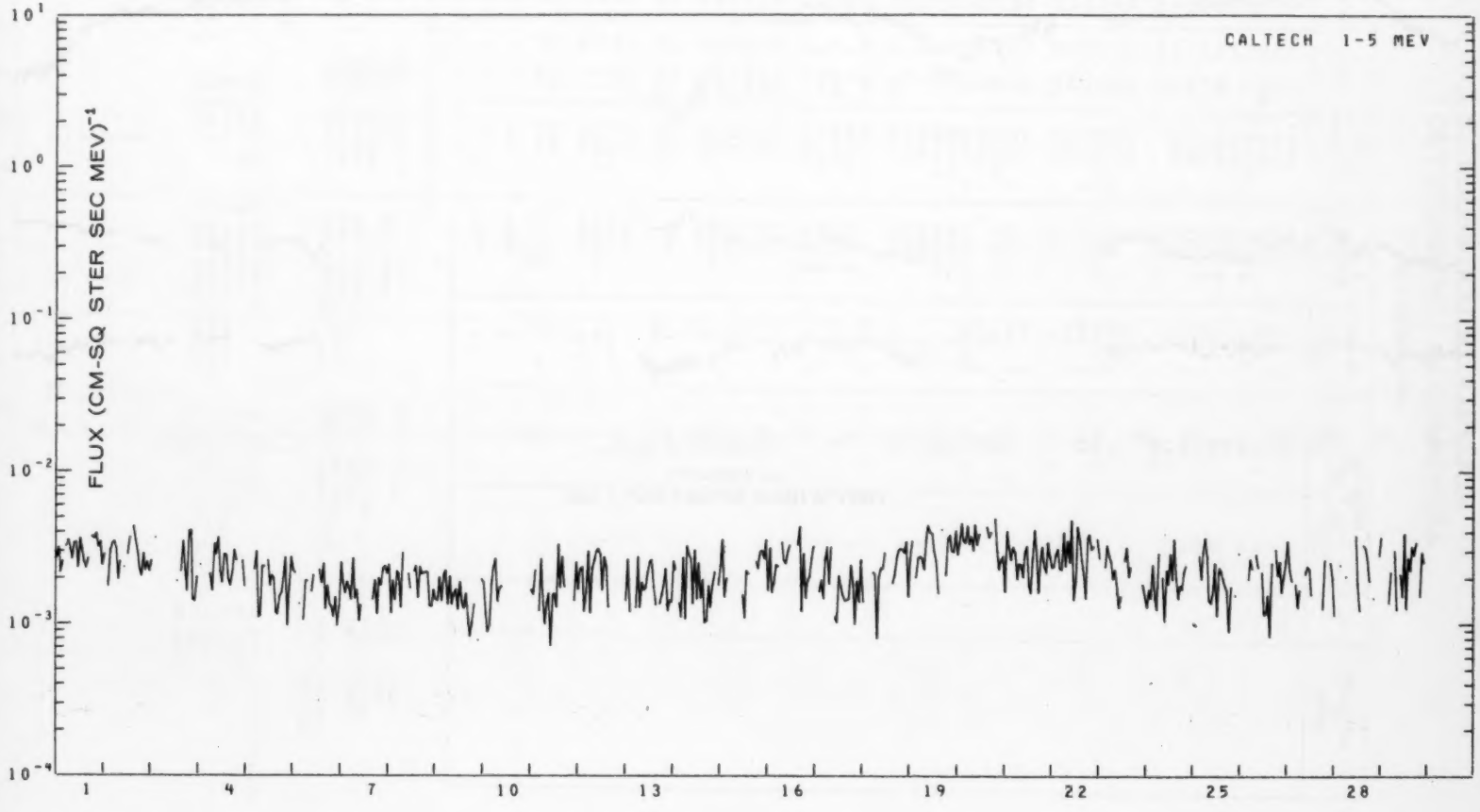
### NOVEMBER 1976




15 Nov 76

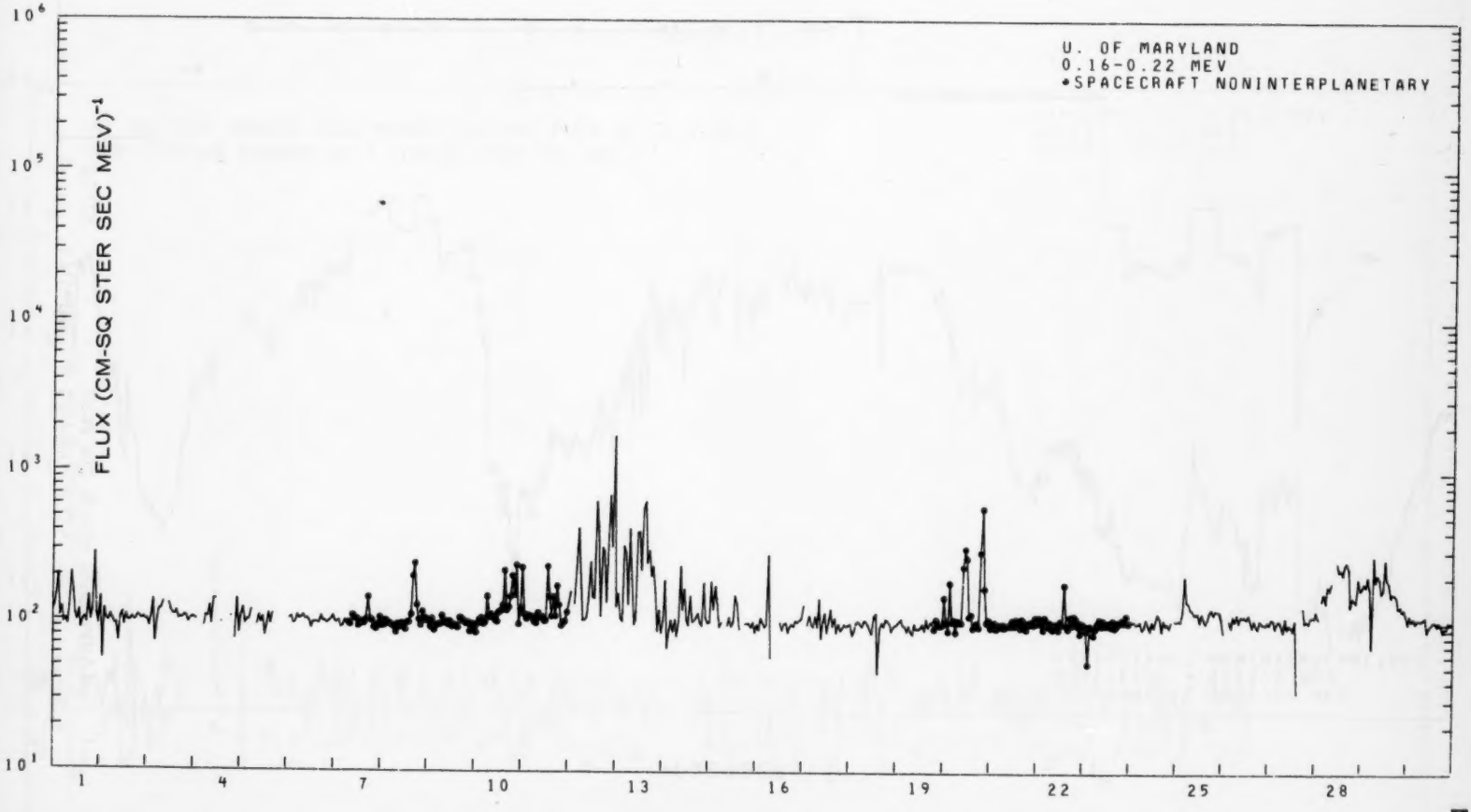
# IMP 7 AND 8 ELECTRONS

NOVEMBER, 1976



# IMP 7 AND 8 LOW ENERGY PROTONS

NOVEMBER, 1976

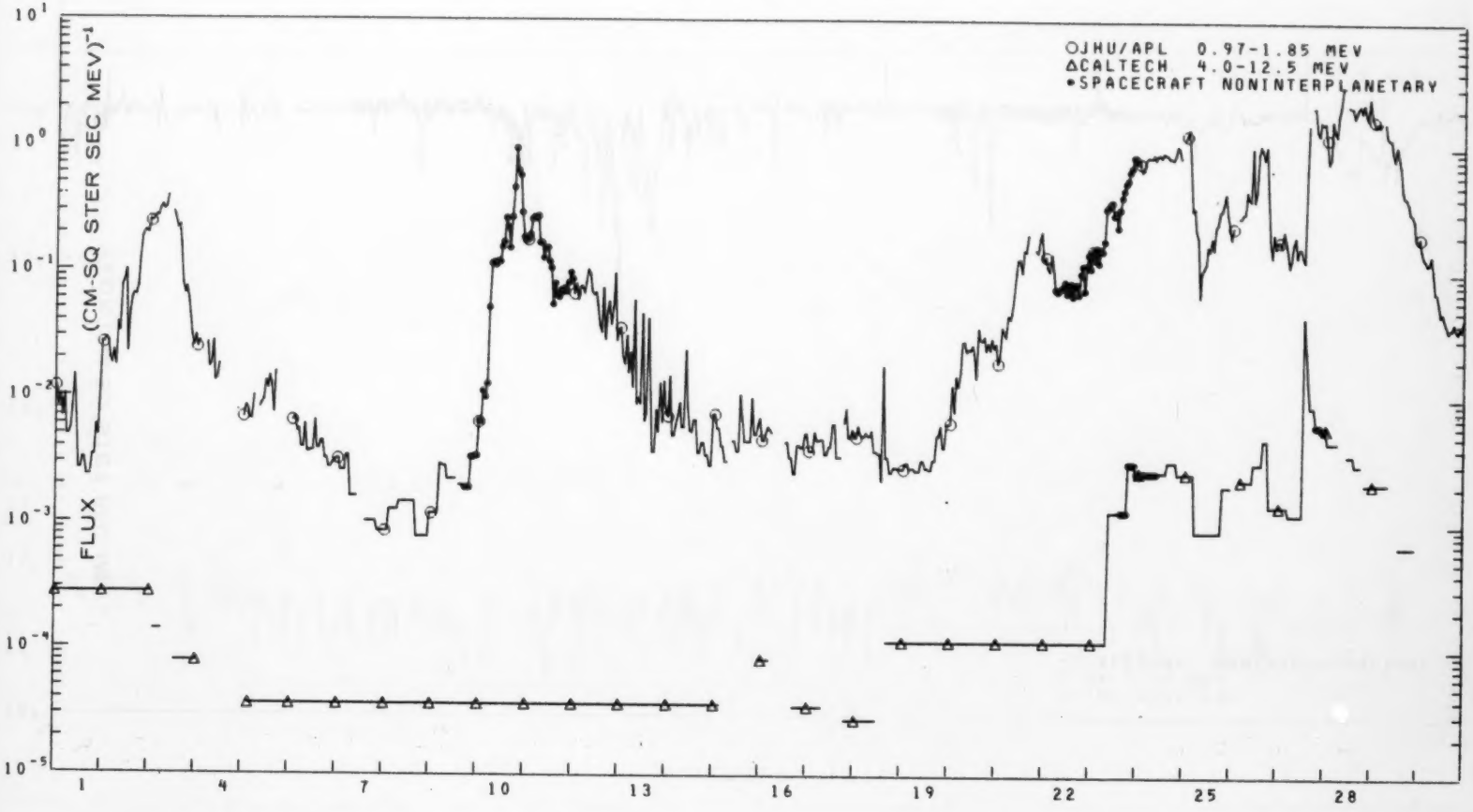



17 Nov 76

# IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

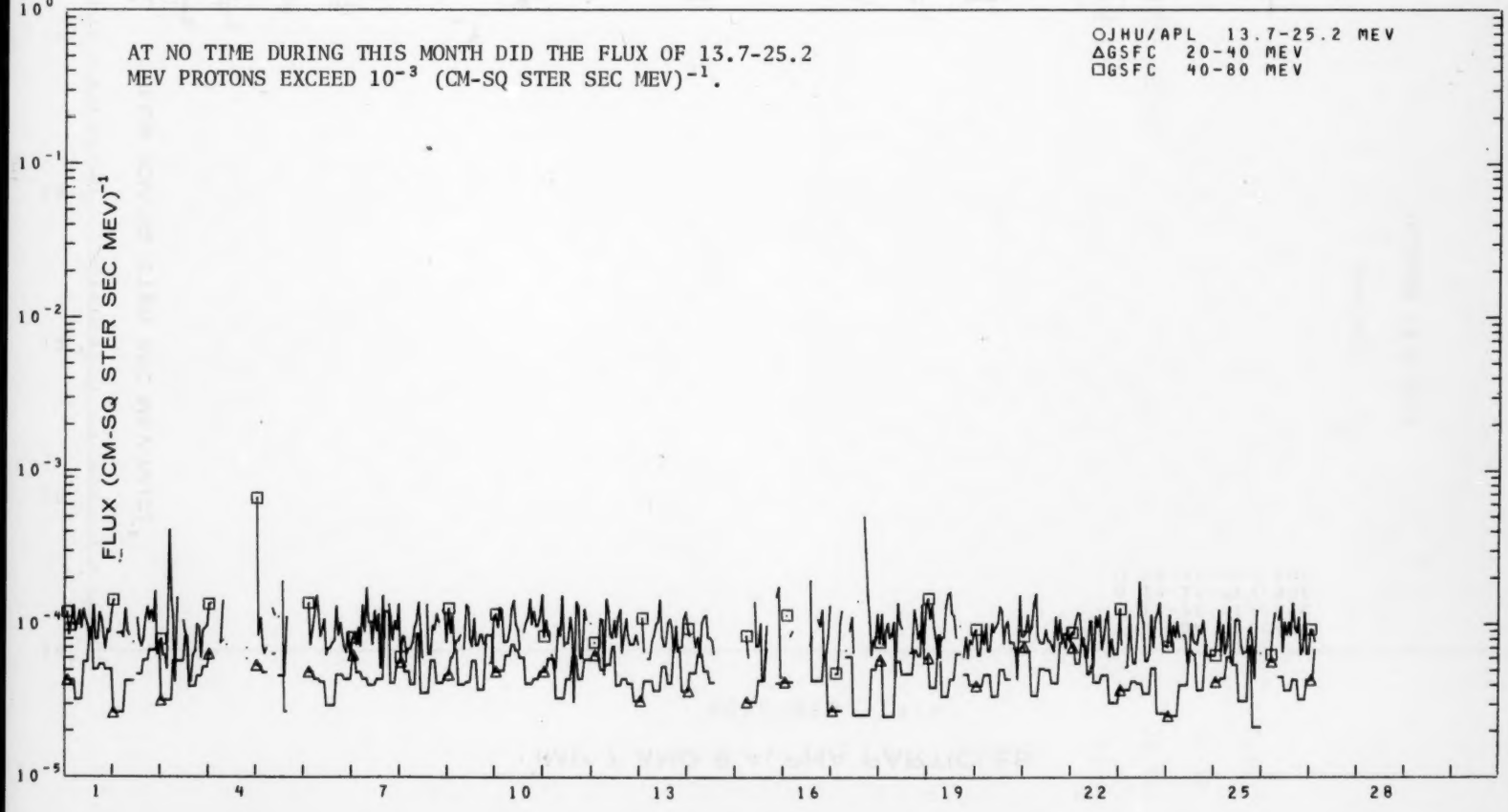
NOVEMBER, 1976





# IMP 7 AND 8 HIGH ENERGY PROTONS

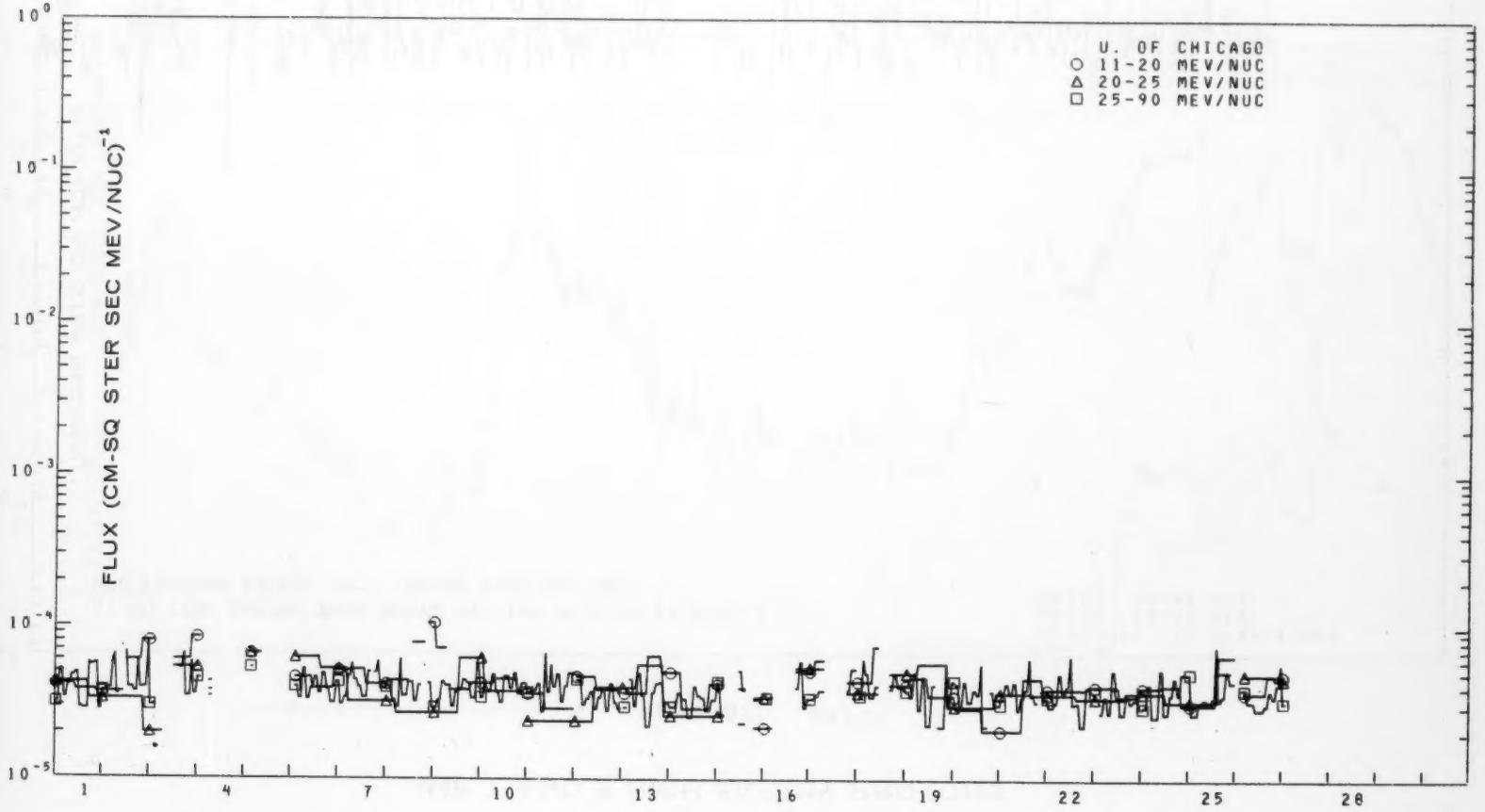
NOVEMBER, 1976




19 Nov 76

# IMP 7 AND 8 ALPHA PARTICLES

NOVEMBER, 1976



# OCTOBER 1976 DATA

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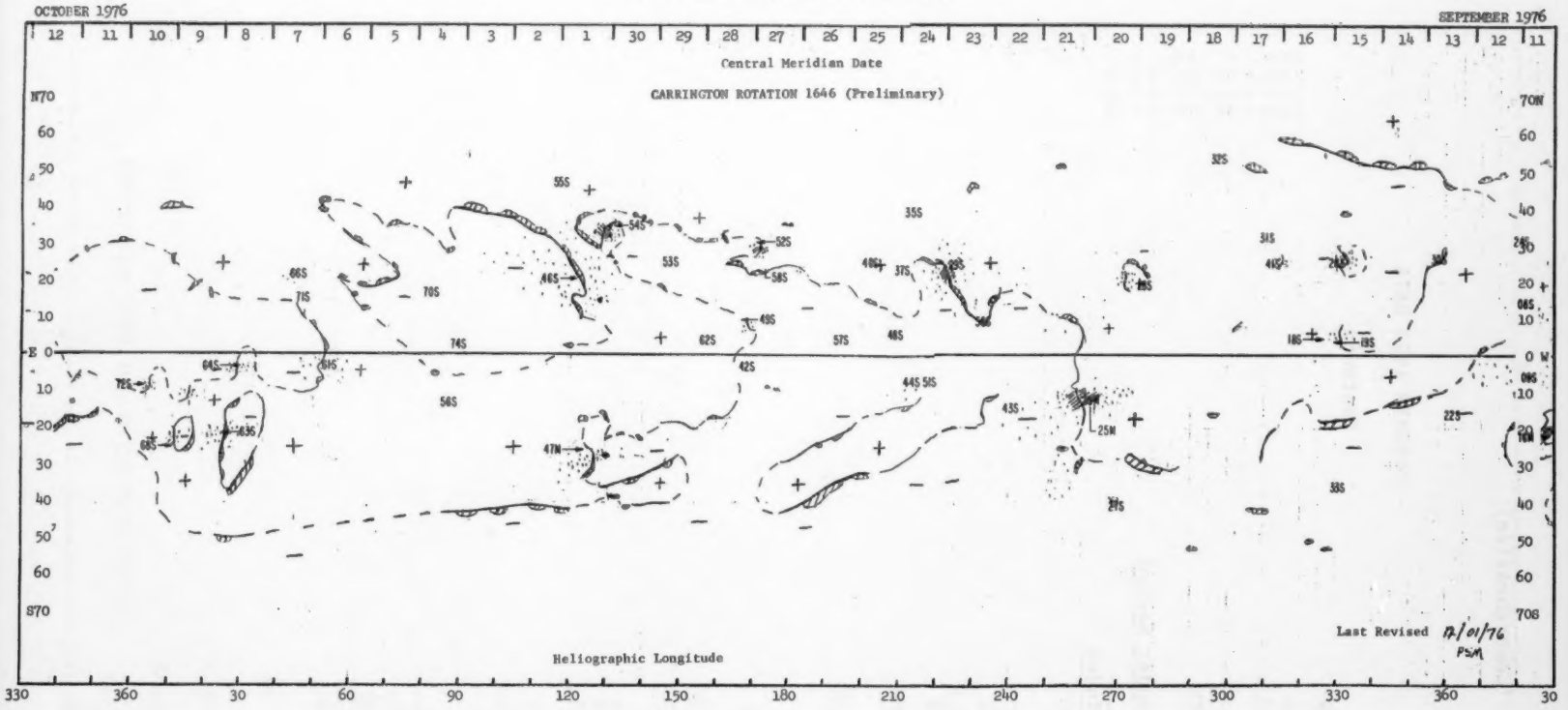
| Abbreviated Calendar Record | 24-31 |
| Regional Flare Index | 31 |

22
Oct 76

# ABBREVIATED CALENDAR RECORD

## Hα SYNOPTIC CHART

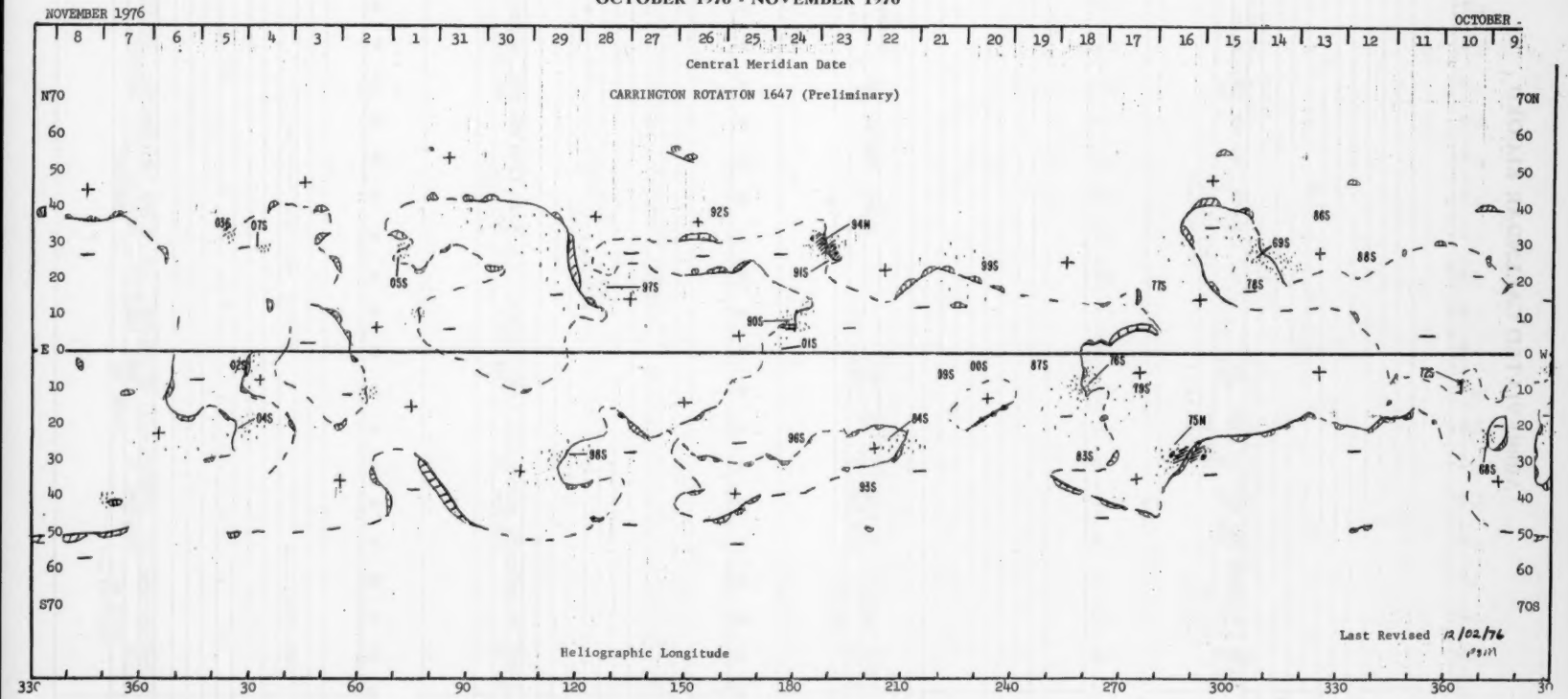
SEPTEMBER 1976 - OCTOBER 1976



# ABBREVIATED CALENDAR RECORD

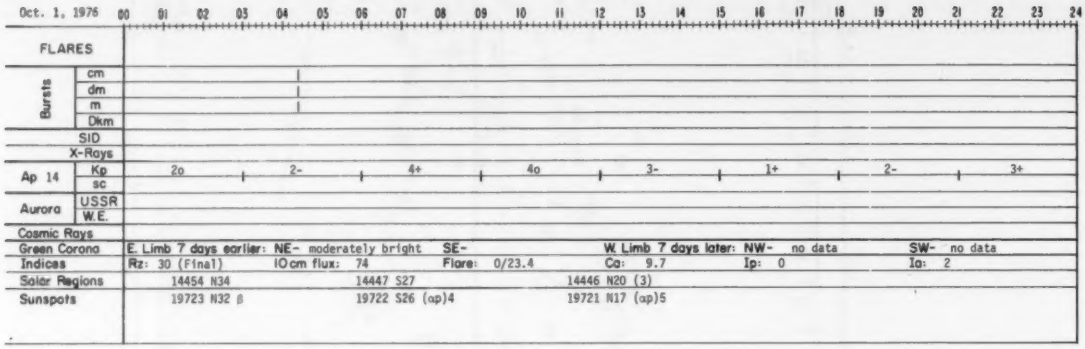
## Hα SYNOPTIC CHART

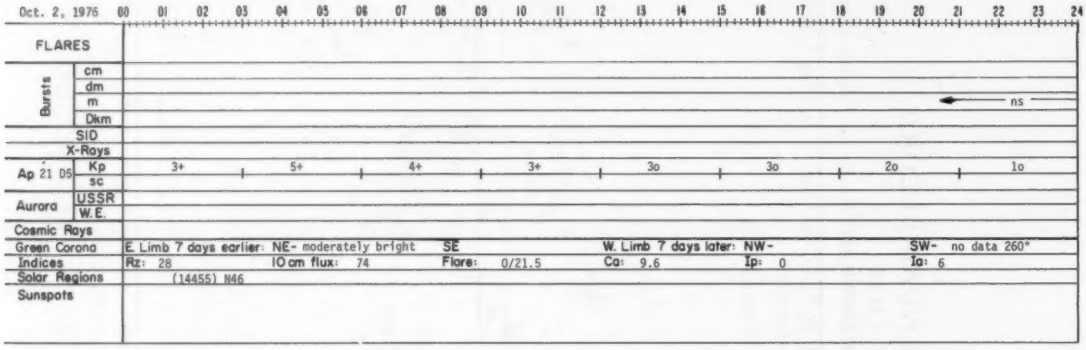
### OCTOBER 1976 - NOVEMBER 1976

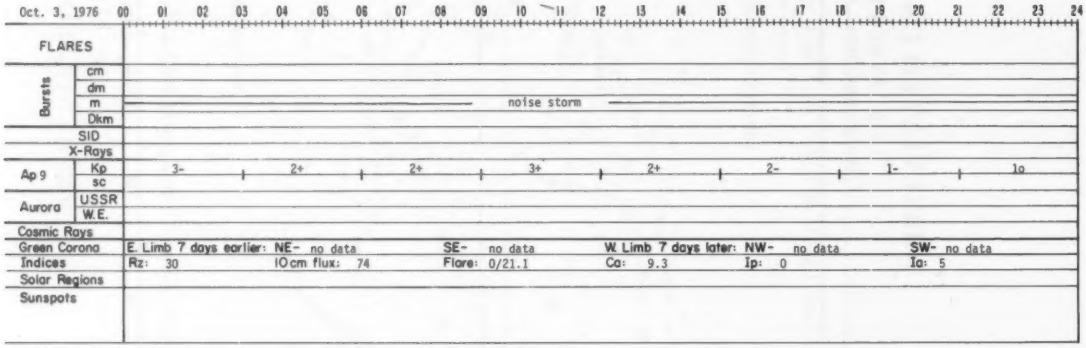


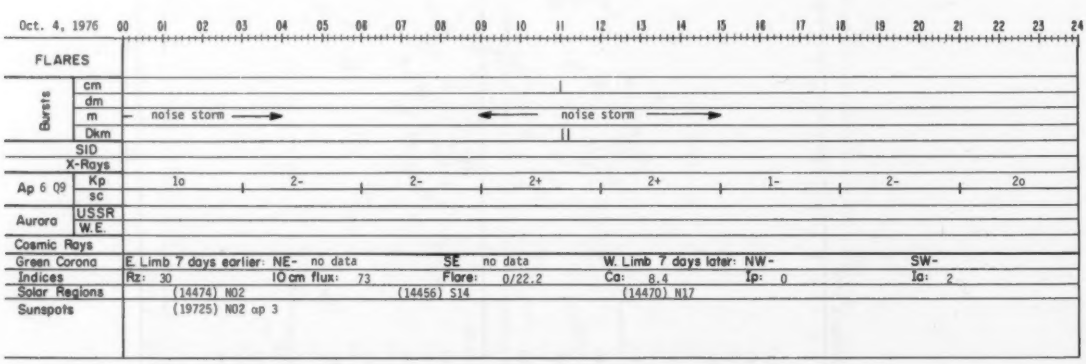

23 Oct 76

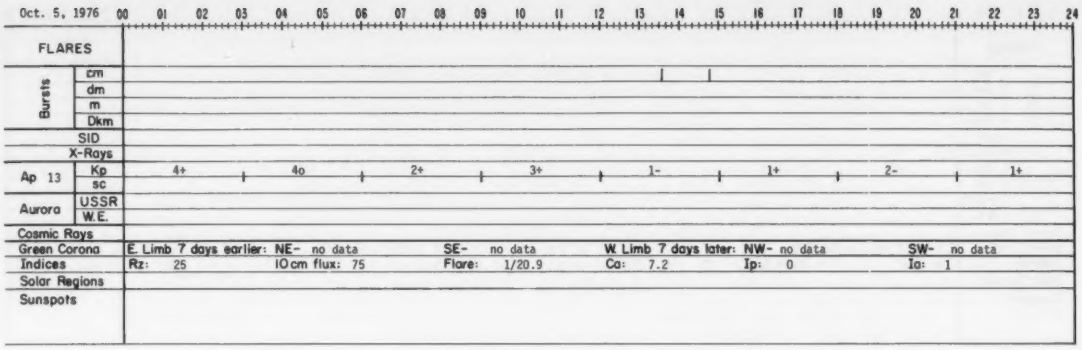
# ABBREVIATED CALENDAR RECORD

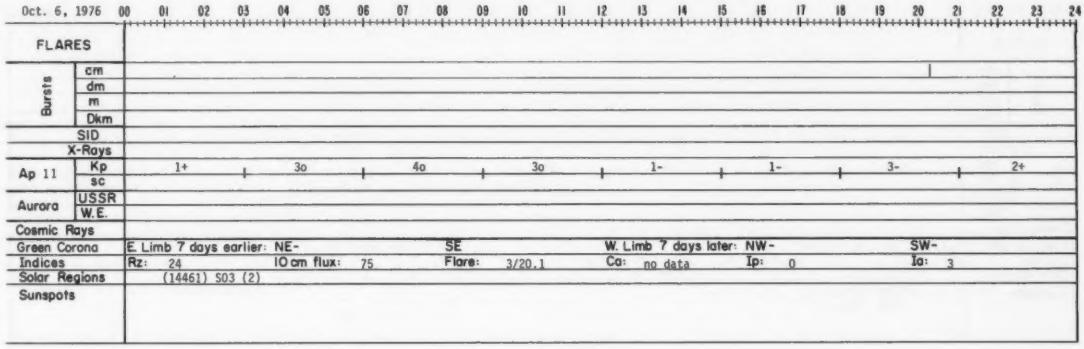

Oct. 1, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 14
Kp
2o 2- 4+ 4o 3- 1+ 2- 3+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE-
W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 30 (Final) 10cm flux: 74 Flare: 0/23.4 Ca: 9.7 Ip: 0 Ia: 2
Solar Regions
14454 N34 14447 S27 14446 N20 (3)
Sunspots
19723 N32 β 19722 S26 (αp)4 19721 N17 (αp)5

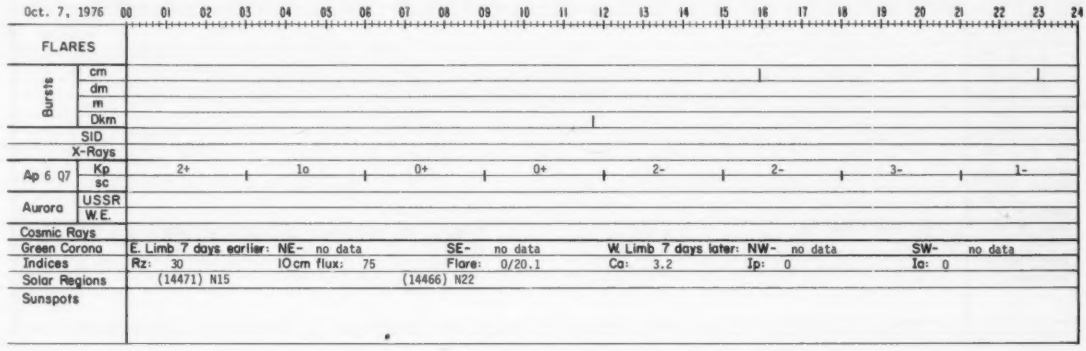



Oct. 5, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 13
Kp
4+ 4o 2+ 3+ 1- 1+ 2- 1+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 25 10cm flux: 75 Flare: 1/20.9 Ca: 7.2 Ip: 0 Ia: 1
Solar Regions
Sunspots


Oct. 6, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 11
Kp
1+ 3o 4o 3o 1- 1- 3- 2+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices
Rz: 24 10cm flux: 75 Flare: 3/20.1 Ca: no data Ip: 0 Ia: 3
Solar Regions
(14461) S03 (2)
Sunspots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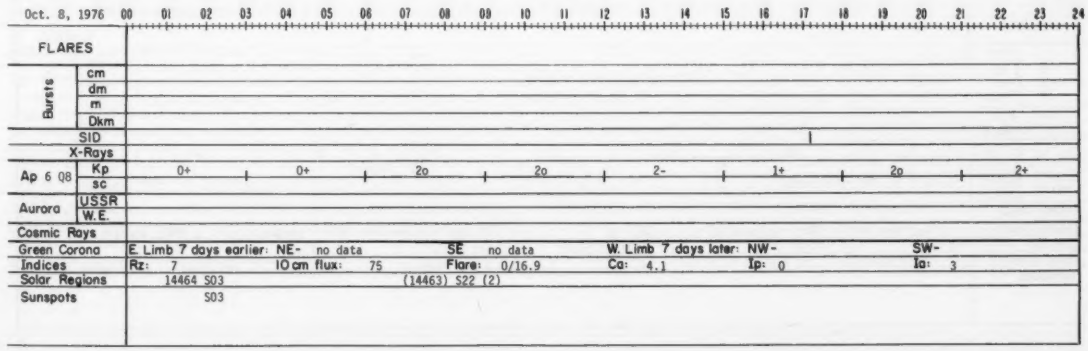
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 6 Q7
Kp
2+ 1o 0+ 0+ 2- 2- 3- 1-
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 30 10cm flux: 75 Flare: 0/20.1 Ca: 3.2 Ip: 0 Ia: 0
Solar Regions
(14471) N15 (14466) N22
Sunspots


Oct. 8, 1976
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 6 Q8
Kp
0+ 0+ 2o 2o 2- 1+ 2o 2+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-
Indices
Rz: 7 10cm flux: 75 Flare: 0/16.9 Ca: 4.1 Ip: 0 Ia: 3
Solar Regions
14464 S03 (14463) S22 (2)
Sunspots
S03

Oct. 9, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 6 Q10 | Kp | 2o 2+ 1+ 2- 2o 1+ 2o 1o |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- no data SE- no data | W. Limb 7 days later: NW- no data SW- no data |
| Indices | Rz: 14 10cm flux: 75 Flare: 0/19.1 | Ca: 3.8 Ip: 0 Ia: 3 |
| Solar Regions | | |
| Sunspots | | |

Oct. 10, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 6 | Kp | 2- 2- 1+ 1+ 1- 2+ 2- 3- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- | SE W. Limb 7 days later: NW- SW- |
| Indices | Rz: 0 10cm flux: 75 Flare: 0/17.0 | Ca: 5.4 Ip: 0 Ia: 1 |
| Solar Regions | 14468 S25 (14472) S09 | |
| Sunspots | (19724) S22 αf 3<br>19726 S23 α 1 | |

Oct. 11, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 8 | Kp | 4- 2- 1o 1- 1+ 2- 2- 3- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- | SE- W. Limb 7 days later: NW- no data 270°-355° SW-no data 180°-270° |
| Indices | Rz: 0 10cm flux: 74 Flare: 0/20.6 | Ca: 5.8 Ip: 0 Ia: 2 |
| Solar Regions | | |
| Sunspots | | |

Oct. 12, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | I |
| SID | | |
| X-Rays | | |
| Ap 14 | Kp | 3- 3o 1o 0+ 2- 2o 4o 5- |
| | sc | ▲ 1400(10) |
| Aurora | USSR | φ = 58° 1900-2200 (HA1) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- no data 25° | SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | Rz: 13 10cm flux: 74 Flare: 0/20.0 | Ca: 7.1 Ip: 0 Ia: 2 |
| Solar Regions | (14488) N26 | |
| Sunspots | | |

Oct. 13, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 8 | Kp | 2- 3o 3- 2o 2- 1- 2- 2- |
| | sc | |
| Aurora | USSR | ϕ = 59° 1800-2100 (HA2) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 17 10cm flux: 73 Flare: 1/19.2 Ca: 9.2 Ip: 0 Ia: 0 |
| Solar Regions | | (14486) N38 |
| Sunspots | | |

Oct. 14, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 7 | Kp | 0+ 1o 1o 1+ 1- 1o 3o 4- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 23 10cm flux: 75 Flare: 5/15.9 Ca: 10.9 Ip: 0 Ia: 2 |
| Solar Regions | | 14469 N26 (2) (14478) N17 |
| Sunspots | | 19727 N29 αp 3 |

Oct. 15, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 33 D2 | Kp | 3o 4- 4o 4+ 5+ 5o 5- 4o |
| | sc | |
| Aurora | USSR | ϕ = 60° 1100 (HB1) and 1200 (HA1) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- |
| Indices | | Rz: 25 10cm flux: 76 Flare: 3/22.7 Ca: 11.1 Ip: 0 Ia: 4 |
| Solar Regions | | |
| Sunspots | | |

Oct. 16, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 29 D4 | Kp | 6- 5- 5- 4- 3o 2+ 3+ 4- |
| | sc | |
| Aurora | USSR | ϕ = 58° 2300 (HB1) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 28 10cm flux: 78 Flare: 5/14.5 Ca: 12.9 Ip: 0 Ia: 7 |
| Solar Regions | | 14475 S26 (14477) N18 |
| Sunspots | | 19728 S27 βf 4 |

Oct. 17, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | \|\| |
| | dm | \|\| |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 30 | Kp | 3+ 4o 5+ 4+ 5+ 3+ 3o 4- |
| | sc | |
| Aurora | USSR | $\phi$ = 60° 1000 ($R_2R_1$) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 31 10cm flux: 78 Flare: 0/17.0 Ca: 13.5 Ip: 0 Ia: 4 |
| Solar Regions | | 14479 S10 (3) |
| Sunspots | | |

Oct. 18, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 19 | Kp | 5- 4o 4- 3o 3+ 3- 3o 2o |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 24 10cm flux: 78 Flare: 0/21.6 Ca: 12.3 Ip: 1 Ia: 5 |
| Solar Regions | | 14476 S09 (14483) S28 |
| Sunspots | | 19729 S09 αf 3 CMP Oct. 19 |

Oct. 19, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | \| \| \| \| \| |
| | dm | \| |
| | m | |
| | Dkm | |
| SID | | \| |
| X-Rays | | |
| Ap 7 | Kp | 0+ 0o 0+ 2- 3o 4- 2o 1+ |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 20 10cm flux: 77 Flare: 5/14.1 Ca: no data Ip: 0 Ia: 5 |
| Solar Regions | | (14487) S03 |
| Sunspots | | |

Oct. 20, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 7 | Kp | 3o 2o 2- 2- 1o 2- 2- 2+ |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data 310°, 335° SW- |
| Indices | | Rz: 19 10cm flux: 76 Flare: 0/17.2 Ca: 9.7 Ip: 0 Ia: 0 |
| Solar Regions | | (14499) N23 (14500) S04 |
| Sunspots | | |

Oct. 21, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 7 | Kp | 2- 3- 2+ 2o 2- 2o 2o 1o |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- |
| Indices | | Rz: 15 10cm flux: 74 Flare: 0/18.5 Ca: 7.9 Ip: 0 Ia: 5 |
| Solar Regions | | (14489) S06 |
| Sunspots | | |

Oct. 22, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

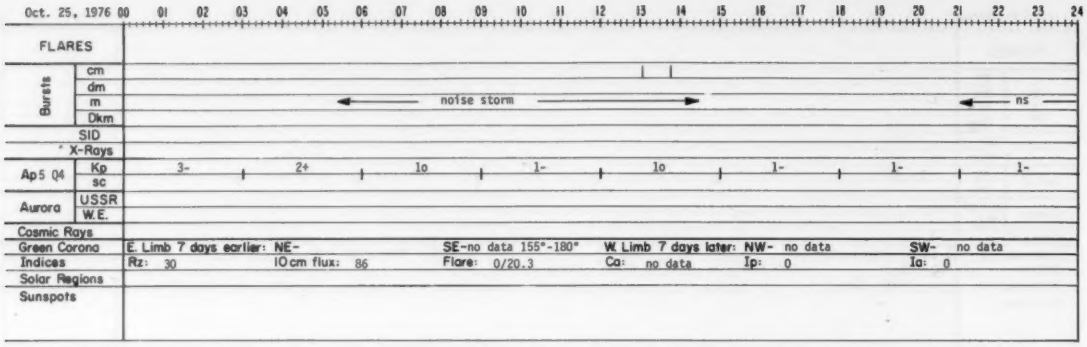
| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 5 Q5 | Kp | 2o 1+ 2o 2o 2o 1o 1- 1- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 22 10cm flux: 76 Flare: 7/20.0 Ca: 6.0 Ip: 0 Ia: 2 |
| Solar Regions | | 14484 S24 |
| Sunspots | | (19730) S25 β 1 |

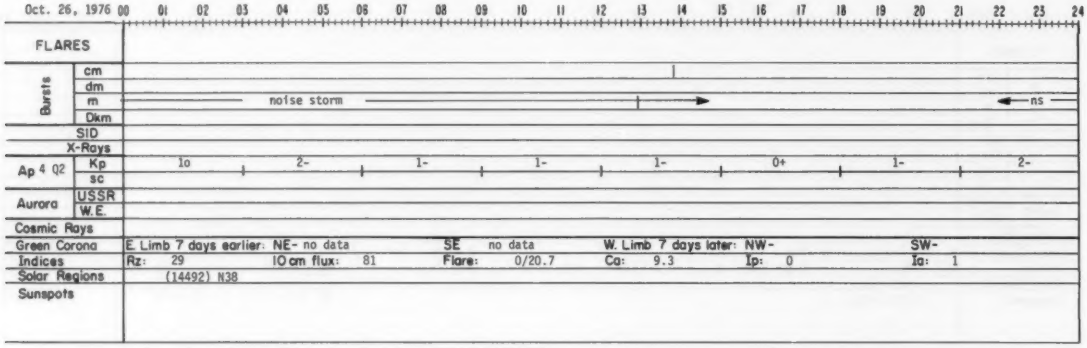
Oct. 23, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

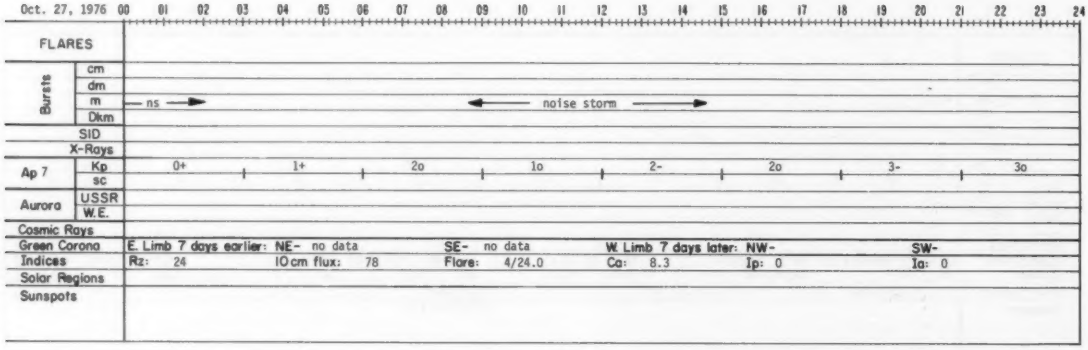
| | | |
|---|---|---|
| FLARES | | — 1f/75 |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 6 | Kp | 2o 2+ 2+ 2+ 1- 1+ 1+ 1o |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- no data 185° |
| Indices | | Rz: 28 10cm flux: 81 Flare: 9/20.7 Ca: 7.0 Ip: 0 Ia: 0 |
| Solar Regions | | (14493) S37 (14491) N25 14494 N30 |
| Sunspots | | 19731 N29 δ 4 |

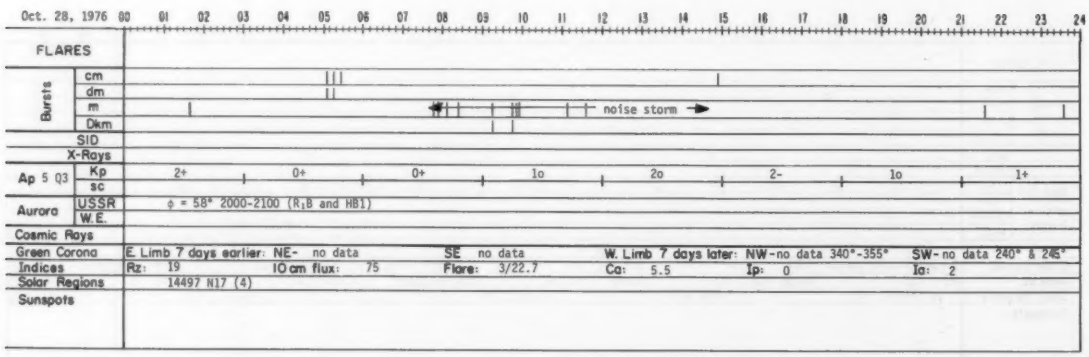
Oct. 24, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

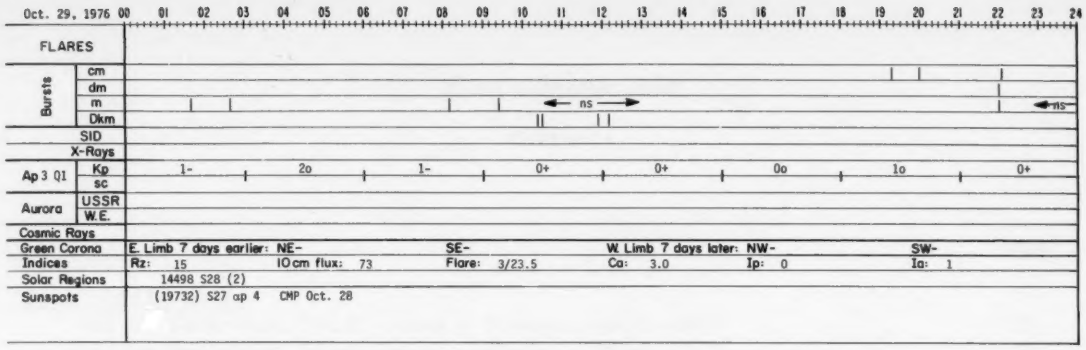
| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap6 Q6K | Kp | 1- 0+ 1o 1o 1- 2- 3+ 1+ |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 30 10cm flux: 81 Flare: 0/21.8 Ca: no data Ip: 0 Ia: 0 |
| Solar Regions | | (14496) S24 14490 N08 (14501) N01 |
| Sunspots | | |

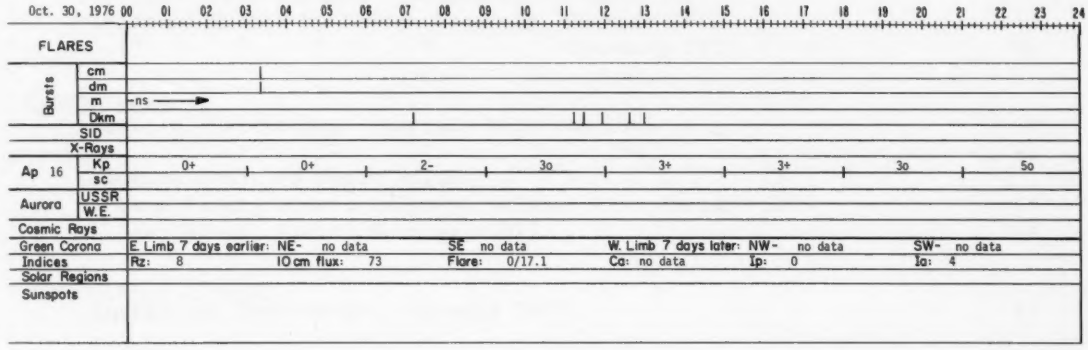

Oct. 25, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
ns
SID
X-Rays
Ap 5 Q4
Kp
sc
3- 2+ 1o 1- 1o 1- 1- 1-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE-no data 155°-180° W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 30 10 cm flux: 86 Flare: 0/20.3 Ca: no data Ip: 0 Ia: 0
Solar Regions
Sunspots

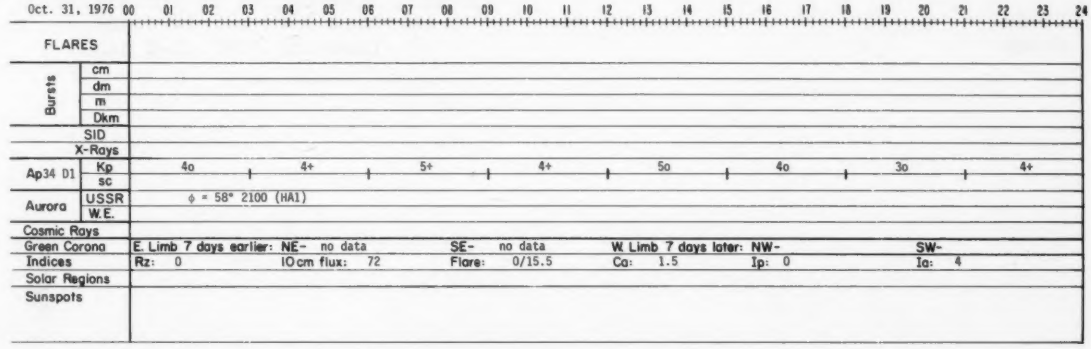

Oct. 26, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
ns
SID
X-Rays
Ap 4 Q2
Kp
sc
1o 2- 1- 1- 1- 0+ 1- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-
Indices
Rz: 29 10 cm flux: 81 Flare: 0/20.7 Ca: 9.3 Ip: 0 Ia: 1
Solar Regions
(14492) N38
Sunspots


Oct. 27, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
ns
noise storm
SID
X-Rays
Ap 7
Kp
sc
0+ 1+ 2o 1o 2- 2o 3- 3o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices
Rz: 24 10 cm flux: 78 Flare: 4/24.0 Ca: 8.3 Ip: 0 Ia: 0
Solar Regions
Sunspots


Oct. 28, 1976 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 5 Q3
Kp
sc
2+ 0+ 0+ 1o 2o 2- 1o 1+
Aurora
USSR
W.E.
ϕ = 58° 2000-2100 (R1B and HB1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW-no data 340°-355° SW-no data 240° & 245°
Indices
Rz: 19 10 cm flux: 75 Flare: 3/22.7 Ca: 5.5 Ip: 0 Ia: 2
Solar Regions
14497 N17 (4)
Sunspots




## REGIONAL FLARE INDEX
### INCLUDES ALL FLARES

| HC MATH PLAGE NO. | LAT | CMP DATE | DATE FIRST FLARE | DATE LAST FLARE | FLARE-INDEX SUM | FLARE-INDEX MEAN | TOTAL NO. OF FLARES |
|---|---|---|---|---|---|---|---|
| 14454 | N34 | 76/10/01.8 | 76/10/05 | 76/10/05 | .51 | .51 | 1 |
| 14468 | S24 | 76/10/10.0 | 76/10/06 | 76/10/06 | 3.21 | 3.21 | 2 |
| 14475 | S27 | 76/10/16.5 | 76/10/16 | 76/10/23 | 15.32 | 1.91 | 5 |
| 14476 | S 9 | 76/10/13.3 | 76/10/13 | 76/10/15 | 9.91 | 3.30 | 4 |

Note:
Because of differences in method of calculation, the dates of Central Meridian Passage for the McMath Plage Regions vary somewhat from those given elsewhere. Any region not listed here produced no flares during its disk passage.

# Miscellaneous Data

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# EAST-WEST SOLAR SCANS

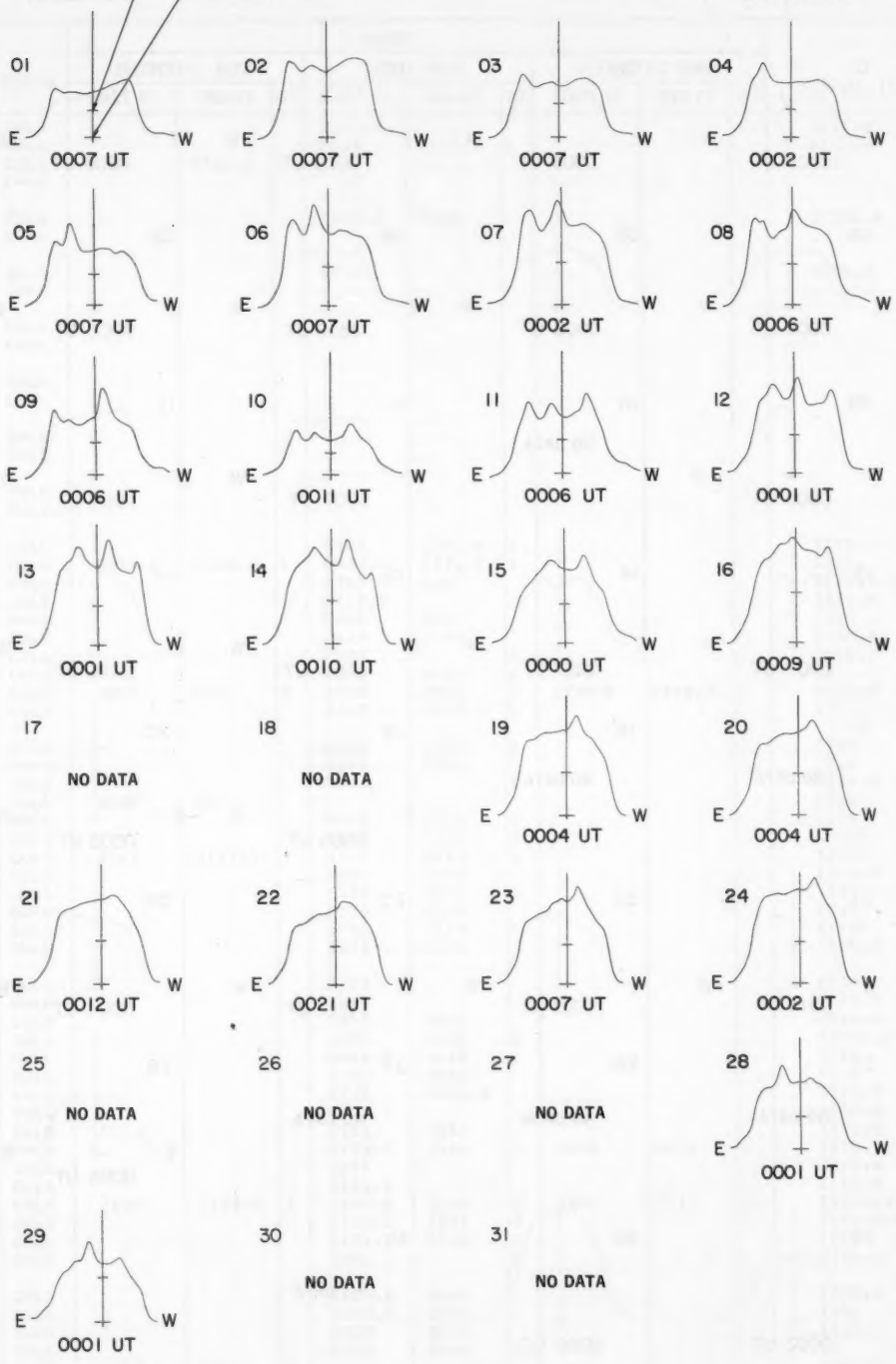
MARCH 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL

COLD SKY LEVEL

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution



# EAST-WEST SOLAR SCANS

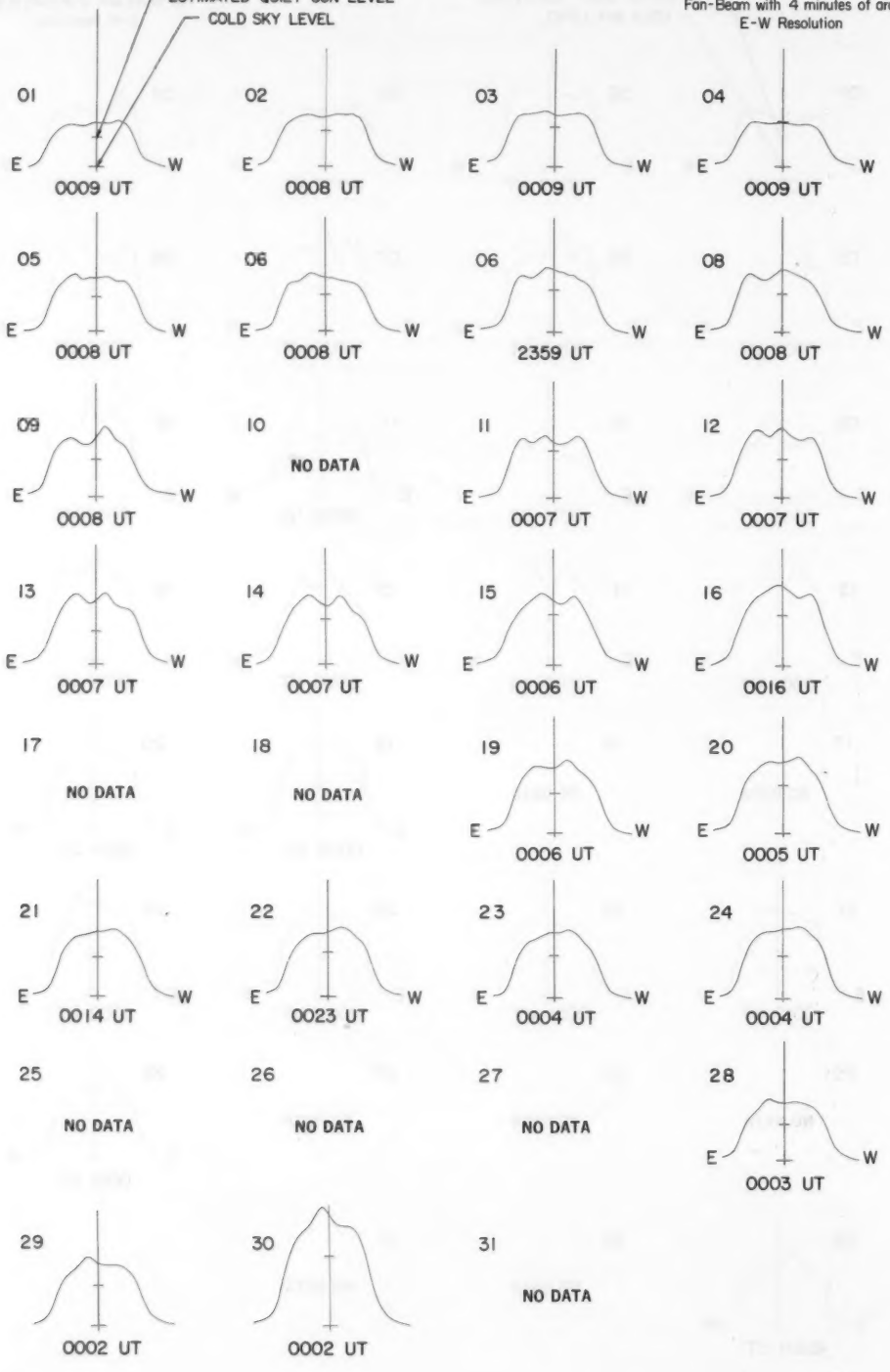
MARCH 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL

COLD SKY LEVEL

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

FEBRUARY 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 01 | 0000 | 0745 | CULG | | | | 0101.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0116 | 0117.5 | 1 | | | | IIIG,U |
| | | | CULG | 0714 | 0714.5 | 1 | | | | | | | IIIG |
| | 2045 | 2400 | CULG | | | | | | | | | | |
| 02 | 0000 | 0746 | CULG | | | | 0020.5 | 0023 | | | | | IIIGG,W |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 03 | 0000 | 0746 | CULG | | | | 0714 | | | | | | IIIB,W |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 04 | 0000 | 0729 | CULG | | | | | | | | | | |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 05 | 0000 | 0746 | CULG | | | | | | | | | | |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 06 | 0000 | 0746 | CULG | | | | | | | | | | |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 07 | 0000 | 0746 | CULG | | | | | | | | | | |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 08 | 0000 | 0746 | CULG | | | | 0332 | 0332.5 | 1 | | | | IIIG,U |
| | | | CULG | 0333.5 | 0334.5 | 1 | 0333.5 | 0334.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0355.5 | 0357 | | | | | IIIG,W,U |
| | | | CULG | | | | 0715.5 | | | | | | IIIB,W |
| | 2046 | 2400 | CULG | | | | 2046 | 2200 | | | | | IS,W |
| | | | CULG | | | | 2139 | 2400 | | | | | IIIN,W |
| | | | CULG | | | | 2139 | | 1 | | | | IIIB,U |
| | | | CULG | | | | 2200 | 2400 | 1 | | | | IS |
| | | | CULG | 2209 | 2211 | 2 | 2209 | 2211 | 3 | 2209.5 | 2210.5 | 2 | IIIG,V |
| | | | CULG | | | | 2322 | 2325.5 | 2 | | | | IIIGG |
| 09 | | | CULG | | | | 0000 | 0530 | 1 | | | | IIIN |
| | 0000 | 0731 | CULG | | | | 0000 | 0731 | | | | | IS,W |
| | | | CULG | | | | 0444 | | 1 | | | | IIIB,U |
| | | | CULG | 0500 | 0731 | | | | | | | | IS,W |
| | | | CULG | | | | 0530 | 0731 | 1 | | | | IIIS |
| | | | CULG | | | | 0640 | 0650 | 1 | | | | UNCLF. |
| | | | CULG | 0717 | 0717.5 | 1 | 0716 | 0721 | 1 | | | | IIIGG |
| | 2046 | 2400 | CULG | | | | 2046 | 2250 | | | | | IIIS,W |
| | | | CULG | | | | 2150 | 2152 | 1 | | | | IIIG |
| | | | CULG | | | | 2205 | 2310 | | | | | IS,W |
| | | | CULG | | | | 2226 | 2229 | 1 | | | | IIIGG |
| | | | CULG | | | | 2250 | 2400 | | | | | IIIN,W |
| 10 | 0000 | 0746 | CULG | | | | 0003 | | | | | | IIIB,W |
| | | | CULG | | | | 0218 | | | | | | IIIB,W |
| | | | CULG | | | | 0348 | 0415 | | | | | IIIN,W |
| | | | CULG | | | | 0356 | 0400 | 2 | | | | IIIGG,V |
| | | | CULG | | | | 0411.5 | 0412 | 1 | | | | IIIG |
| | | | CULG | | | | 0453 | 0505 | | | | | IS,W |
| | | | CULG | | | | 0732 | 0732.5 | | | | | IIIG,W |
| | | | CULG | | | | 0737.5 | | | | | | IIIB,W |
| | 2046 | 2400 | CULG | | | | 2051 | 2052 | | | | | IIIG,W |
| | | | CULG | | | | 2053.5 | 2056 | 2 | 2054 | 2056 | 1 | IIIGG,U |
| | | | CULG | | | | 2057 | | | | | | IIIB,W |
| | | | CULG | | | | 2104.5 | | | | | | IIIB,W |
| | | | CULG | 2108 | 2108.5 | 1 | 2107.5 | 2110 | 2 | 2108 | 2110 | 1 | IIIGG,V,U |
| | | | CULG | | | | 2128.5 | 2130 | 2 | | | | IIIG,V,U |
| | | | CULG | | | | 2131.5 | 2136 | 2 | | | | IIIGG |
| | | | CULG | | | | 2341 | | 1 | | | | IIIB |
| 11 | 0000 | 0746 | CULG | | | | 0019.5 | 0746 | | | | | IIIN,W |
| | | | CULG | | | | 0053.5 | 0055 | 1 | | | | IIIG |
| | | | CULG | | | | 0720 | 0739 | | | | | IS,W |
| | | | CULG | | | | 0739 | 0746 | 1 | | | | IS |
| | | | CULG | 0740 | 0741 | 1 | | | | | | | CONT,P |
| | | | CULG | | | | 0740 | 0741 | 2 | | | | UNCLF |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS
**FEBRUARY 1977**

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 11 | | | CULG | | | | 0742.5 | 0744 | 1 | | | | IIIGG |
| | 2046 | 2400 | CULG | | | | 2046 | 2400 | 1 | | | | IS,DC |
| | | | CULG | | | | 2046 | 2400 | 1 | | | | IIIS |
| | | | CULG | 2046 | 2400 | | | | | | | | IS,W |
| | | | CULG | | | | 2123 | | 1 | | | | IIIB |
| | | | CULG | 2232.5 | 2233 | 1 | 2232.5 | 2233.5 | 1 | 2232.5 | 2233.5 | 1 | IIIG |
| 12 | | | CULG | | | | 0000 | 0746 | | | | | IIIS,W |
| | | | CULG | 0000 | 0746 | | | | | | | | IS,W |
| | 0000 | 0746 | CULG | | | | 0000 | 0746 | 1 | | | | IS,DC |
| | | | CULG | | | | 0244.5 | | 1 | | | | IIIB |
| | | | CULG | | | | 0733 | 0733.5 | 2 | | | | IIIG |
| | 2046 | 2400 | CULG | 2046 | 2400 | | 2046 | 2400 | | | | | IS,W |
| | | | CULG | | | | 2046 | 2400 | 1 | | | | IIIS |
| 13 | 0000 | 0746 | CULG | 0000 | 0746 | | 0000 | 0746 | | | | | IS,W |
| | | | CULG | | | | 0000 | 0500 | | | | | IIIS,W |
| | | | CULG | | | | 0500 | 0746 | | | | | IIIN,W |
| | | | CULG | | | | 2046 | 2400 | | | | | IIIN,W |
| | 2046 | 2400 | CULG | | | | 2046 | 2400 | | | | | IS,W |
| | | | CULG | | | | 2119 | 2121 | 1 | | | | IIIG |
| | | | CULG | | | | 2257 | 2300.5 | 2 | 2257 | 2300.5 | 1 | IIIGG |
| | | | CULG | | | | 2304 | 2305 | 2 | 2304.5 | 2305 | 1 | IIIG |
| | | | CULG | | | | 2345.7 | 2347 | 1 | 2345.5 | 2346 | 1 | IIIG |
| 14 | | | CULG | | | | 0000 | 0400 | | | | | IIIN,W |
| | 0000 | 0731 | CULG | | | | 0000 | 0731 | | | | | IS,W |
| | | | CULG | 0013.5 | 0014 | 1 | 0013 | 0014 | 2 | | | | IIIG |
| | | | CULG | | | | 0020 | 0023 | 1 | | | | IIIGG |
| | | | CULG | 0023.5 | 0024.5 | 1 | 0023.5 | 0024.5 | 2 | 0023.5 | 0024 | 1 | IIIG |
| | | | CULG | | | | 0028.5 | | 1 | | | | IIIB |
| | | | CULG | | | | 0534 | 0534.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0727.5 | 0728 | 1 | | | | IIIG |
| | | | CULG | | | | 2046 | 2200 | | | | | IIIS,W |
| | 2046 | 2400 | CULG | | | | 2046 | 2125 | | | | | IS,W |
| | | | CULG | | | | 2200 | 2400 | | | | | IIIN,W |
| 15 | 0000 | 0746 | CULG | | | | 0000 | 0320 | | | | | IIIN,W |
| | | | CULG | | | | 0136 | 0615 | | | | | IS,W |
| | | | CULG | | | | 0320 | 0540 | | | | | IIIS,W |
| | | | CULG | 0400 | 0600 | | | | | | | | IS,W |
| | | | CULG | | | | 0540 | 0746 | | | | | IIIN,W |
| | 2046 | 2400 | CULG | | | | 2057 | | | | | | IIIB,W |
| | | | CULG | | | | 2340 | 2343 | | | | | IIIG,W |
| 16 | 0000 | 0746 | CULG | | | | 0002.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0230 | 0410 | | | | | IIIN,W |
| | | | CULG | | | | 0251 | 0252 | 1 | | | | IIIG |
| | | | CULG | 0422 | 0422.5 | | | | | | | | IIIG,W |
| | | | CULG | | | | 0439.5 | 0440 | 1 | | | | IIIG |
| | | | CULG | | | | 0506 | | 1 | 0506 | | 1 | IIIB |
| | | | CULG | | | | 0623 | 0624 | 1 | | | | IIIG |
| | | | CULG | | | | 0700 | | 1 | | | | IIIB |
| | | | CULG | | | | 0736 | 0737 | 1 | | | | IIIG |
| | 2046 | 2400 | CULG | | | | 2046 | 2345 | | | | | IIIN,W |
| | | | CULG | | | | 2046 | 2400 | | | | | IS,W |
| | | | CULG | | | | 2136 | 2136.5 | 1 | | | | IIIG,U |
| | | | CULG | | | | 2139 | 2140.5 | 2 | | | | IIIG,U |
| | | | CULG | 2323 | 2323.5 | 1 | 2322.5 | 2323.5 | 1 | | | | IIIG |
| | | | CULG | 2325.5 | 2327.5 | 1 | 2325.5 | 2327.5 | 1 | | | | IIIG |
| | | | CULG | | | | 2342 | 2344 | 1 | | | | IIIG |
| 17 | 0000 | 0746 | CULG | | | | 0140.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0341 | 0342.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0437.5 | 0438 | | | | | IIIG,W |
| | | | CULG | | | | 0454.5 | | | | | | IIIG,W |
| | 2046 | 2400 | CULG | | | | 2057 | 2057.5 | | | | | IIIG,W |
| | | | CULG | | | | 2310 | 2335 | | | | | IIIN,W |
| 18 | 0000 | 0746 | CULG | | | | 0232.5 | | 1 | | | | IIIB |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

FEBRUARY 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 18 | | | CULG | | | | 0459 | | | | | | IIIB,W |
| | | | CULG | | | | 0528.5 | | | | | | IIIB,W |
| | | | CULG | 0615 | 0616 | 1 | 0615 | 0616 | 1 | | | | IIIG,U |
| | | | CULG | | | | 0701 | | | | | | IIIB,W |
| | | | CULG | | | | 0716.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0737.5 | 0739 | | | | | IIIG,W |
| | 2046 | 2400 | CULG | | | | 2046 | 2155 | | | | | IIIN,W |
| 19 | 0000 | 0746 | CULG | | | | 0745.5 | | | | | | IIIB,W |
| | 2046 | 2125 | CULG | | | | 2046 | 2111 | | | | | IIIN,W |
| | 2108 | 2400 | CULG | | | | 2224 | 2225 | 1 | | | | IIIG |
| 20 | 0000 | 0746 | CULG | 0302 | 0410 | | | | | | | | IS,W |
| | | | CULG | | | | 0427.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0449.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0523.5 | | | | | | IIIB,W |
| | 2046 | 2400 | CULG | | | | 2143 | 2303 | | | | | IIIN,W |
| | | | CULG | 2253 | 2257 | 1 | 2230 | 2400 | 1 | | | | IS |
| 21 | 0000 | 0746 | CULG | | | | 0000 | 0255 | 1 | | | | IS |
| | | | CULG | | | | 0102 | 0608 | | | | | IIIN,W |
| | | | CULG | | | | 0249 | | 2 | | | | IIIB |
| | | | CULG | | | | 0518 | 0520 | 2 | | | | IIIG |
| | | | CULG | | | | 0529 | | 1 | | | | IIIB |
| | 2046 | 2400 | CULG | | | | 2108.5 | 2257 | | | | | IIIN,W |
| 22 | 0000 | 0745 | CULG | | | | 0220.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0509 | | | | | | IIIB,W |
| | 2046 | 2400 | CULG | | | | | | | | | | |
| 23 | 0000 | 0728 | CULG | | | | 0008 | | | | | | IIIB,W |
| | | | CULG | | | | 0011 | | | | | | IIIB,W |
| | | | CULG | | | | 0110.5 | 0111 | | | | | IIIG,W |
| | | | CULG | | | | 0542 | | | | | | IIIB,W |
| | | | CULG | | | | 0551 | 0552 | | | | | IIIG,W |
| | 2045 | 2314 | CULG | | | | | | | | | | |
| | 2335 | 2400 | CULG | | | | | | | | | | |
| 24 | 0000 | 0015 | CULG | | | | | | | | | | |
| | 0130 | 0745 | CULG | | | | 0649.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0703.5 | 0704.5 | | | | | IIIG,W |
| | | | CULG | | | | 0710 | 0745 | | | | | IS,W |
| | 2045 | 2206 | CULG | | | | 2046 | | | | | | IIIB,W |
| | | | CULG | | | | 2110.5 | 2111 | | | | | IIIG,W |
| | 2233 | 2400 | CULG | | | | | | | | | | |
| 25 | 0015 | 0032 | CULG | | | | 0027.5 | 0028 | 1 | | | | IIIG |
| | 0423 | 0745 | CULG | | | | | | | | | | |
| | 2045 | 2400 | CULG | | | | 2150.5 | 2151 | | | | | IIIG,W |
| | | | CULG | | | | 2249.5 | 2250.5 | 1 | | | | IIIG |
| 26 | 0000 | 0745 | CULG | | | | | | | | | | |
| | 2045 | 2400 | CULG | | | | | | | | | | |
| 27 | 0000 | 0745 | CULG | | | | 0312.5 | 0314 | 1 | | | | UNCLF. |
| | 2045 | 2400 | CULG | | | | | | | | | | |
| 28 | 0000 | 0745 | CULG | | | | | | | | | | |
| | 2045 | 2400 | CULG | | | | 2058 | 2059.5 | 2 | | | | IIIG,U |
| | | | CULG | | | | 2214 | | | | | | IIIB,W |

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

# SELECTED SOLAR EVENTS

## JANUARY 1977

**Culgoora**

| UT Date 1977 JANUARY | HELIOGRAPH EVENT | | | | | | | Spectral Type | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Start (UT) | End (UT) | Freq. (MHz) | Positions: Central Dist. ($R_\odot$) | Positions: Position Angle (Deg.) | Polarization | Intensity (1-3) | | |
| 2 | 0000 | 0500 | 160 | 1.0 | 265 | r | 1 | I | ‡ |
| | 0301.5 | 0302.5 | 43.25 | | 270 | | 3 | | |
| | | | 80 | 1.0 | 260 | - | 3 | IIIG | * |
| | | | 160 | | 265 | | 2 | | |
| 2/3 | 2300 | 0500 | 80 | 1.1 | 320 | 1 | 1 | I ‡ | Type I emission continued from this source until 7th |
| | | | 160 | .9 | | | | | |
| 4 | 0015.5 | | 80 | 1.0 | 320 | - | 2 | IIIB | * |
| 12/13 | 2300 | 0500 | 80 | .7 | 170 | Varying | 1 | I | ‡ Type I emission continued from this source until 21st |
| | | | 160 | | | | | | |
| 17/18 | 2300 | 0500 | 160 | .9 | 20 | 1 | 1 | I | ‡ Type I emission continued from this source until 19th |
| 23 | 2300 | 0500 | 160 | .1 | 320 | r | 1 | I | Persisted until 24th |
| 28 | 2300 | 0500 | 160 | .9 | 230 | r | 1 | I | Persisted until 29th |
| 31 | 0433 | 0500 | 80 | 1.1 | 50 | | 1 | I | |
| | | | 160 | 1.0 | | | | | |

Days without Heliograph observations: Nil

* Other type III's observed from same position during the day

‡ Type III activity associated with this region

# SELECTED SOLAR EVENTS

## FEBRUARY 1977

Culgoora

| UT Date 1977 February | HELIOGRAPH EVENT | | | | | | | Spectral Type | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Start (UT) | End (UT) | Freq. (MHz) | Positions: Central Dist. ($R_\odot$) | Positions: Position Angle (Deg.) | Polarization | Intensity (1-3) | | |
| 8/9 | 2300 | 0500 | 80<br>160 | 1.1<br>1.0 | 130 | Varying | 1 | I | Type III activity persisted until the 16th. Type III activity also associated with this region. |
| | 2322 | 2325 | 80<br>160 | 1.1<br>1.0 | 130 | 0 | 2 | IIIGG | * |
| 10 | 0356 | 0400 | 80<br>160 | 1.5<br>1.2 | 60 | 0 | 2<br>1 | IIIGG,V | * |
| 11 | 0053 | 0055 | 80<br>160 | 1.0 | 270 | 0 | 2 | IIIG | * |
| 13 | 2300 | 0500 | 160 | 1.2 | 90 | r | 1 | I | |
| | 2304 | 2305 | 80<br>160 | .5 | 0 | 0 | 1<br>2 | IIIG | * Type I activity from this region persisted until 17th |
| 19/20 | 2300 | 0500 | 160 | 1.1 | 220 | 0 | 1 | I | |
| 20/21 | 2300 | 0500 | 80<br>160 | 0 | 0 | r | 1 | I | * Type III activity also associated with this region |
| 27 | 0312 | 0314 | 80<br>160 | 1.0<br>0.8 | 220 | 0 | 1 | unclf. | |

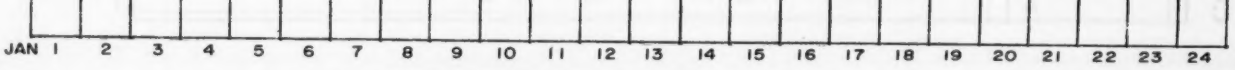
Days without Heliograph observations: ..... Nil .....

* Other type III's observed at same position during the day.

# COSMIC RAY INDICES
(Neutron Monitors)

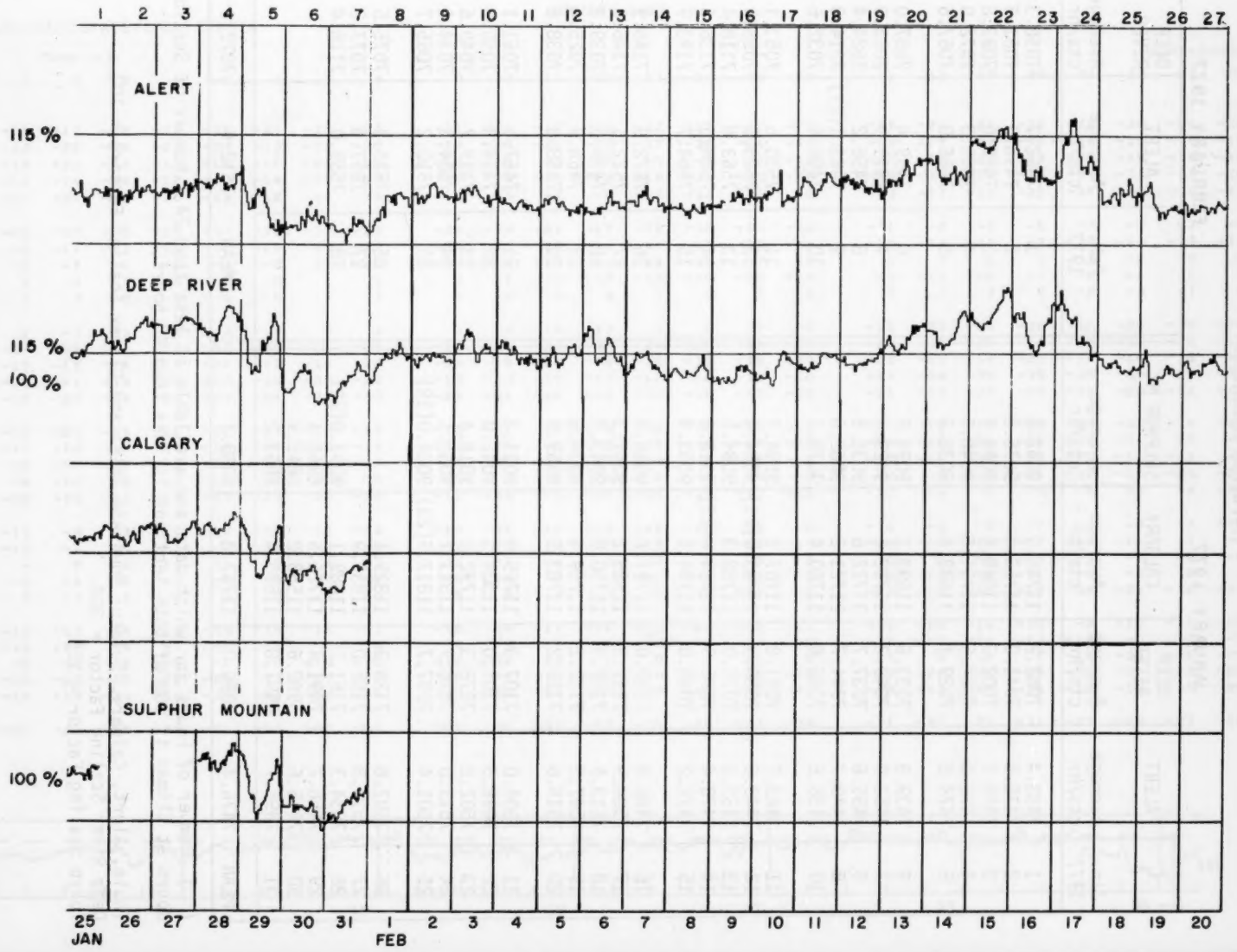
Bartels Rotation 1961 (January 1977)

COSMIC RAY INDICES
(Neutron Monitors)




# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1962 ( January - February 1977 )



# COSMIC RAY INDICES

## (Neutron Monitors)

| | JANUARY 1977 | | | | FEBRUARY 1977 | | |
|---|---|---|---|---|---|---|---|
| | ALERT | DEEP RIVER | CALGARY | SULPHUR MT | | ALERT | DEEP RIVER |
| Jan. 1977 | Average cts/hr | Average cts/hr | Average cts/hr | Average cts/hr | Feb. 1977 | Average cts/hr | Average cts/hr |
| 1 | 7483.4 | 7062.2 | 11745.0 | 9062.8 | 1 | 7462.7 | 7058.3 |
| 2 | 7478.5 | 7041.0 | 11753.1 | 9075.8 | 2 | 7498.0 | 7061.5 |
| 3 | 7466.7 | 7002.3 | 11698.4 | 9054.4 | 3 | 7495.6 | 7093.8 |
| 4 | 7479.6 | 7027.5 | 11711.8 | 9048.6 | 4 | 7465.3 | 7072.0 |
| 5 | 7474.5 | 7029.1 | 11693.6 | 9038.3 | 5 | 7466.0 | 7067.6 |
| 6 | 7439.5 | 7033.6 | 11693.2 | 9024.5 | 6 | 7459.4 | 7087.0 |
| 7 | 7452.9 | 7049.2 | 11702.1 | 9023.7 | 7 | 7479.9 | 7043.0 |
| 8 | 7455.6 | 7037.7 | 11722.6 | 9038.5 | 8 | 7456.2 | 7024.4 |
| 9 | 7440.7 | 7044.7 | 11721.2 | 9062.6 | 9 | 7483.1(21) | 7014.3 |
| 10 | 7436.5 | 7066.6 | 11760.4 | 9079.1 | 10 | 7496.4 | 7032.6 |
| 11 | 7443.7 | 7091.8 | 11767.2 | 9094.7 | 11 | 7530.5 | 7053.1 |
| 12 | 7443.6 | 7080.3 | 11783.0(23) | 9084.4 | 12 | 7525.5 | 7055.0 |
| 13 | 7453.0 | 7075.9 | 11788.3 | 9084.5 | 13 | 7563.8 | 7118.4 |
| 14 | 7478.4 | 7085.9 | 11820.0(23) | 9112.8 | 14 | 7568.5 | 7136.6 |
| 15 | 7472.2 | 7088.0 | 11794.2 | 9053.4 | 15 | 7664.7 | 7193.9 |
| 16 | 7486.5 | 7119.0 | 11791.6 | 9055.0 | 16 | 7572.9 | 7146.9 |
| 17 | 7508.9 | 7152.3 | 11825.2 | 9047.3 | 17 | 7622.1 | 7146.5 |
| 18 | 7513.6 | 7157.8 | 11790.0 | 9043.7 | 18 | 7499.0 | 7039.8 |
| 19 | 7507.2 | 7122.2 | 11759.4 | 8934.6 | 19 | 7468.9 | 7025.4 |
| 20 | 7515.6 | 7119.2 | 11783.5 | 8969.0 | 20 | 7458.8 | 7038.6 |
| 21 | 7504.0 | 7107.3 | 11769.9 | 9001.3 | 21 | 7467.1 | 7051.1 |
| 22 | 7498.5 | 7103.0 | 11804.1 | 9042.0 | 22 | 7494.3 | 7050.8 |
| 23 | 7502.8 | 7078.3 | 11792.8 | 9018.4 | 23 | 7499.7 | 7040.6 |
| 24 | 7513.0 | 7078.7 | 11811.2 | 9033.1 | 24 | 7504.3 | 7034.1 |
| 25 | 7501.4 | 7097.7 | 11817.5(23) | 9024.0(18) | 25 | 7510.2 | 7065.7 |
| 26 | 7502.8 | 7126.9 | 11829.1 | | 26 | 7523.3 | 7075.5 |
| 27 | 7510.3 | 7155.0 | 11837.9 | | 27 | 7557.1 | 7077.2 |
| 28 | 7534.3 | 7161.2 | 11889.1 | 9093.8(22) | 28 | 7559.0 | 7118.4 |
| 29 | 7458.2 | 7091.4 | 11726.5 | 8968.4 | | | |
| 30 | 7415.6 | 6982.6 | 11563.2 | 8843.9 | | | |
| 31 | 7396.7 | 6997.8 | 11550.4 | 8863.2 | | | |
| MEAN | 7476.4 | 7080.0 | 11757.8 | 9030.1 | MEAN | 7512.6 | 7072.2 |

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Thule, Alert, Calgary, Sulphur Mountain, Kiel and Climax Scaling Factors = 100.
Deep River Scaling Factor = 300.
Tokyo Scaling Factor = 128.

## HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

JANUARY 1977

(Time-UT) (Units-Gammas)

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -16 | -17 | -18 | -21 | -25 | -27 | -24 | -23 | -21 | -21 | -17 | -18 | -22 | -21 | -22 | -20 | -17 | -20 | -21 | -20 | -21 | -30 | -26 | -22 |
| 2 | -23 | -26 | -26 | -28 | -27 | -23 | -23 | -23 | -23 | -23 | -22 | -22 | -27 | -26 | -24 | -22 | -18 | -17 | -18 | -16 | -16 | -15 | -15 | -15 |
| 3 | -14 | -12 | -12 | -13 | -11 | -10 | -11 | -12 | -10 | -9 | -8 | -7 | -9 | -9 | -8 | -11 | -12 | -22 | -29 | -27 | -20 | -19 | -19 | -16 |
| 4 | -13 | -14 | -14 | -12 | -13 | -14 | -10 | -11 | -9 | -10 | -14 | -18 | -18 | -21 | -29 | -34 | -36 | -35 | -35 | -35 | -34 | -32 | -28 | -28 |
| 5 | -27 | -26 | -22 | -21 | -18 | -12 | -10 | -8 | -12 | -6 | -7 | -8 | -13 | -16 | -15 | -9 | -13 | -17 | -15 | -21 | -24 | -32 | -28 | -24 |
| 6 | -22 | -28 | -20 | -19 | -17 | -18 | -22 | -25 | -26 | -24 | -21 | -17 | -18 | -16 | -16 | -16 | -11 | -8 | -7 | -6 | -7 | -5 | -7 | -6 |
| 7 | -9 | -11 | -11 | -10 | -10 | -15 | -20 | -22 | -21 | -18 | -19 | -16 | -14 | -13 | -13 | -14 | -16 | -14 | -11 | -7 | -10 | -15 | -13 | -11 |
| 8 | -9 | -7 | -6 | -6 | -2 | -5 | -8 | -10 | -11 | -10 | -10 | -11 | -12 | -10 | -7 | -1 | 2 | 3 | 5 | 5 | 3 | -2 | 0 | 4 |
| 9 | 8 | 8 | 7 | 6 | 3 | 5 | 1 | 0 | 0 | -1 | -3 | -3 | -10 | -10 | -10 | -10 | -9 | -11 | -2 | -1 | -6 | -4 | -2 | 1 |
| 10 | 3 | 3 | 2 | 4 | 6 | 6 | 4 | 1 | 1 | -2 | 0 | 0 | 3 | 2 | 4 | 5 | 3 | 3 | 2 | 0 | -2 | -3 | -1 | 0 |
| 11 | 1 | -1 | -1 | 1 | 3 | 4 | 0 | 2 | 3 | 9 | 15 | 10 | 5 | 4 | -1 | -9 | -20 | -26 | -19 | -20 | -16 | -20 | -20 | -24 |
| 12 | -27 | -32 | -31 | -27 | -22 | -22 | -24 | -24 | -23 | -24 | -23 | -21 | -24 | -26 | -26 | -27 | -31 | -35 | -23 | -16 | -20 | -22 | -20 | -17 |
| 13 | -15 | -15 | -14 | -17 | -20 | -18 | -19 | -20 | -18 | -16 | -14 | -13 | -15 | -16 | -19 | -24 | -23 | -20 | -19 | -20 | -19 | -18 | -18 | -16 |
| 14 | -20 | -21 | -19 | -15 | -12 | -19 | -22 | -18 | -13 | -13 | -15 | -13 | -12 | -16 | -19 | -20 | -21 | -34 | -39 | -30 | -26 | -28 | -30 | -33 |
| 15 | -27 | -24 | -24 | -25 | -27 | -26 | -26 | -30 | -23 | -21 | -24 | -25 | -19 | -16 | -17 | -19 | -25 | -27 | -26 | -27 | -24 | -20 | -18 | -19 |
| 16 | -18 | -21 | -21 | -21 | -22 | -19 | -16 | -18 | -13 | -11 | -7 | -6 | -8 | -12 | -18 | -18 | -20 | -17 | -16 | -18 | -20 | -20 | -16 | -17 |
| 17 | -17 | -15 | -17 | -19 | -18 | -19 | -16 | -14 | -10 | -5 | -4 | -5 | -4 | -6 | -13 | -20 | -21 | -16 | -11 | -12 | -12 | -11 | -9 | -8 |
| 18 | -9 | -12 | -17 | -18 | -15 | -19 | -34 | -29 | -18 | -15 | -20 | -20 | -8 | -9 | -12 | -12 | -17 | -18 | -18 | -16 | -12 | -11 | -11 | -9 |
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| 23 | 4 | 8 | 9 | 11 | 10 | 9 | 4 | 3 | -1 | -4 | -4 | -3 | -3 | 3 | 5 | 5 | 5 | 3 | -6 | -11 | -9 | -5 | -6 | -4 |
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| 28 | -5 | -6 | -6 | -7 | -9 | -9 | -10 | -10 | -11 | -12 | -6 | -2 | 0 | 1 | -1 | 0 | 1 | 9 | 4 | 7 | -14 | -34 | -36 | -29 |
| 29 | -23 | -18 | -20 | -20 | -29 | -30 | -29 | -30 | -38 | -41 | -35 | -25 | -24 | -24 | -28 | -28 | -27 | -28 | -28 | -30 | -30 | -31 | -29 | -25 |
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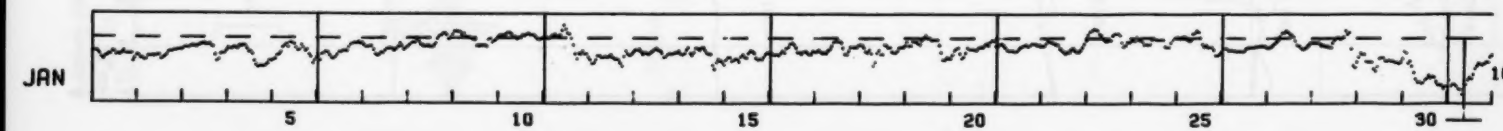
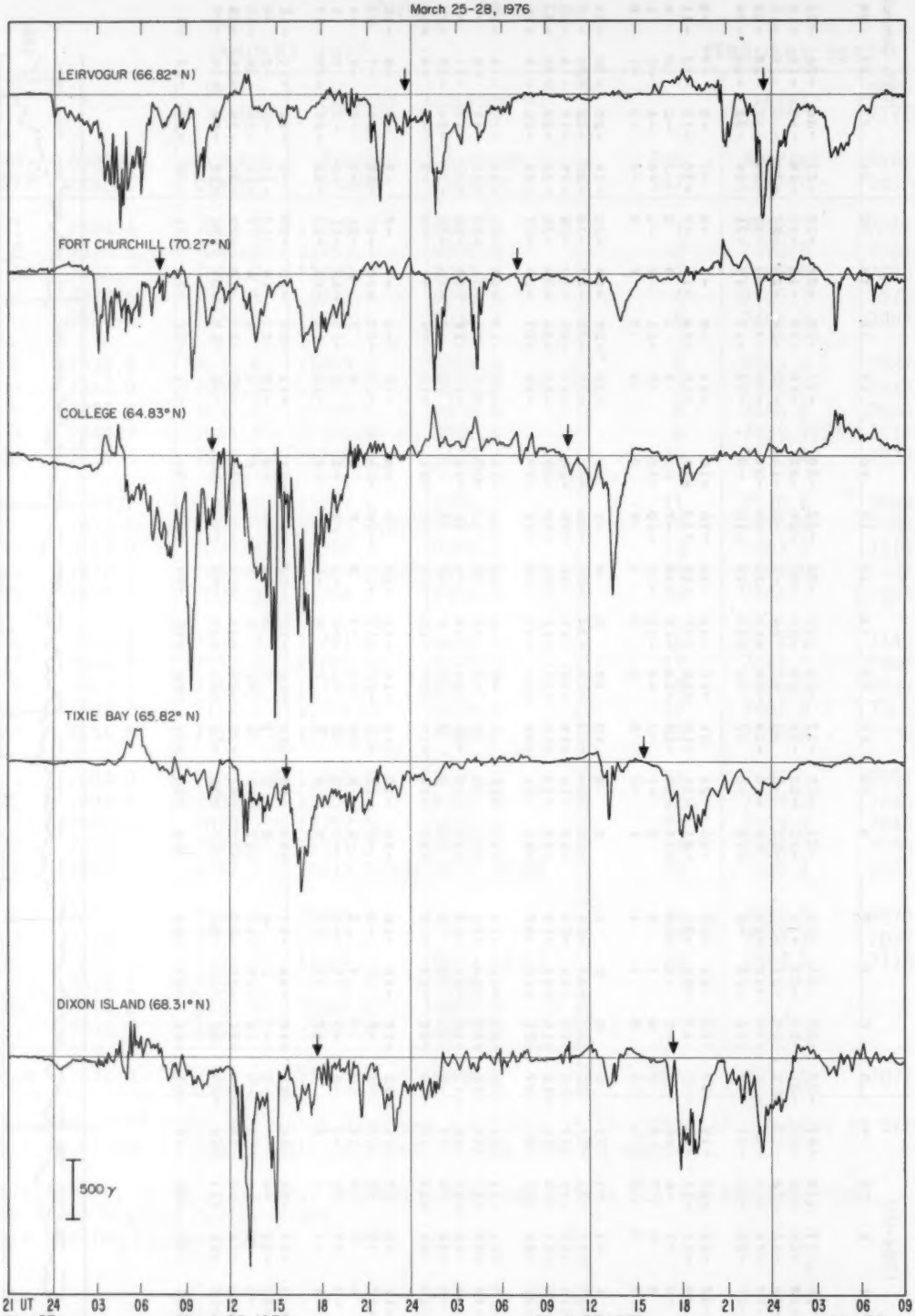


46
Misc
Mar 76

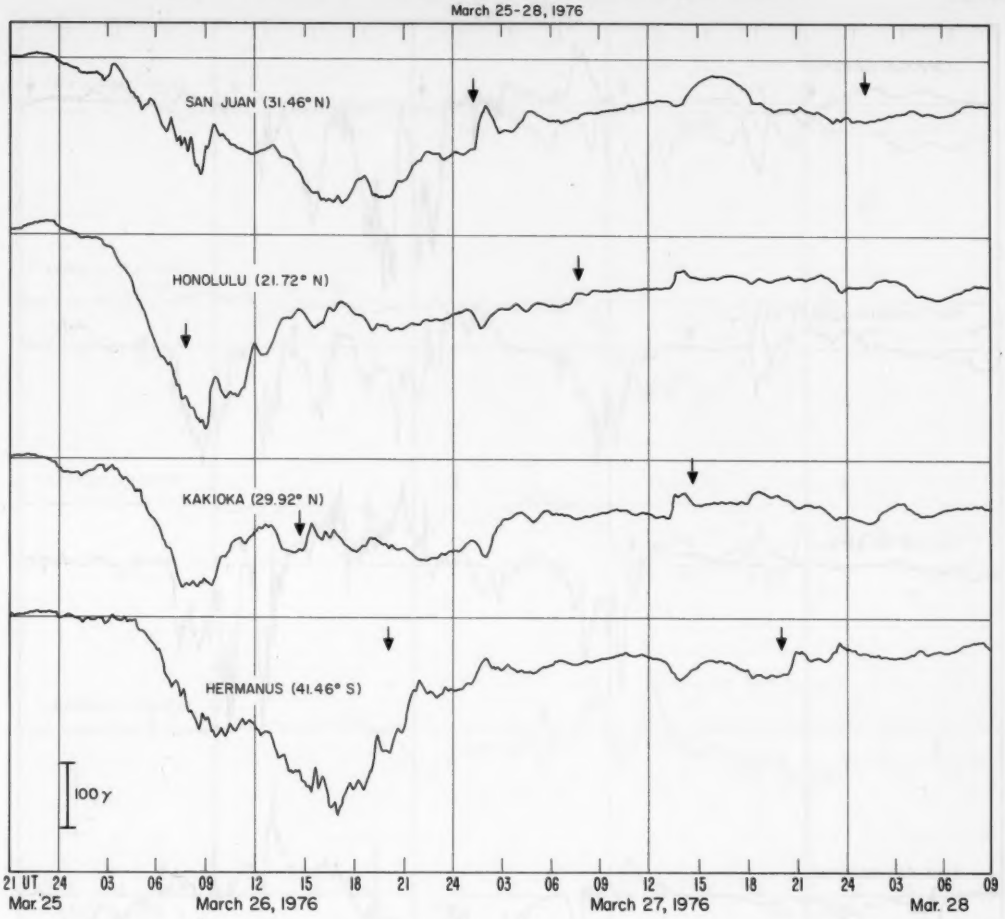
# H-COMPONENT MAGNETOGRAMS OF GEOMAGNETIC STORMS

March 25-28, 1976

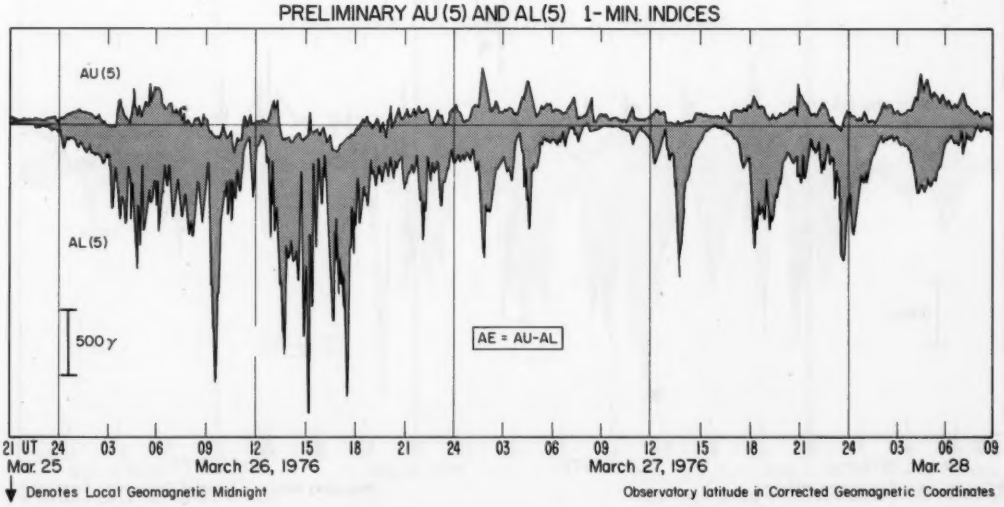

LEIRVOGUR (66.82° N)
FORT CHURCHILL (70.27° N)
COLLEGE (64.83° N)
TIXIE BAY (65.82° N)
DIXON ISLAND (68.31° N)
500 γ
21 UT 24 03 06 09 12 15 18 21 24 03 06 09 12 15 18 21 24 03 06 09
Mar. 25
March 26, 1976
March 27, 1976
Mar. 28
↓ Denotes Local Geomagnetic Midnight
Observatory latitude in Corrected Geomagnetic Coordinates

# H-COMPONENT MAGNETOGRAMS OF GEOMAGNETIC STORMS

March 25-28, 1976




## PRELIMINARY AU (5) AND AL(5) 1-MIN. INDICES

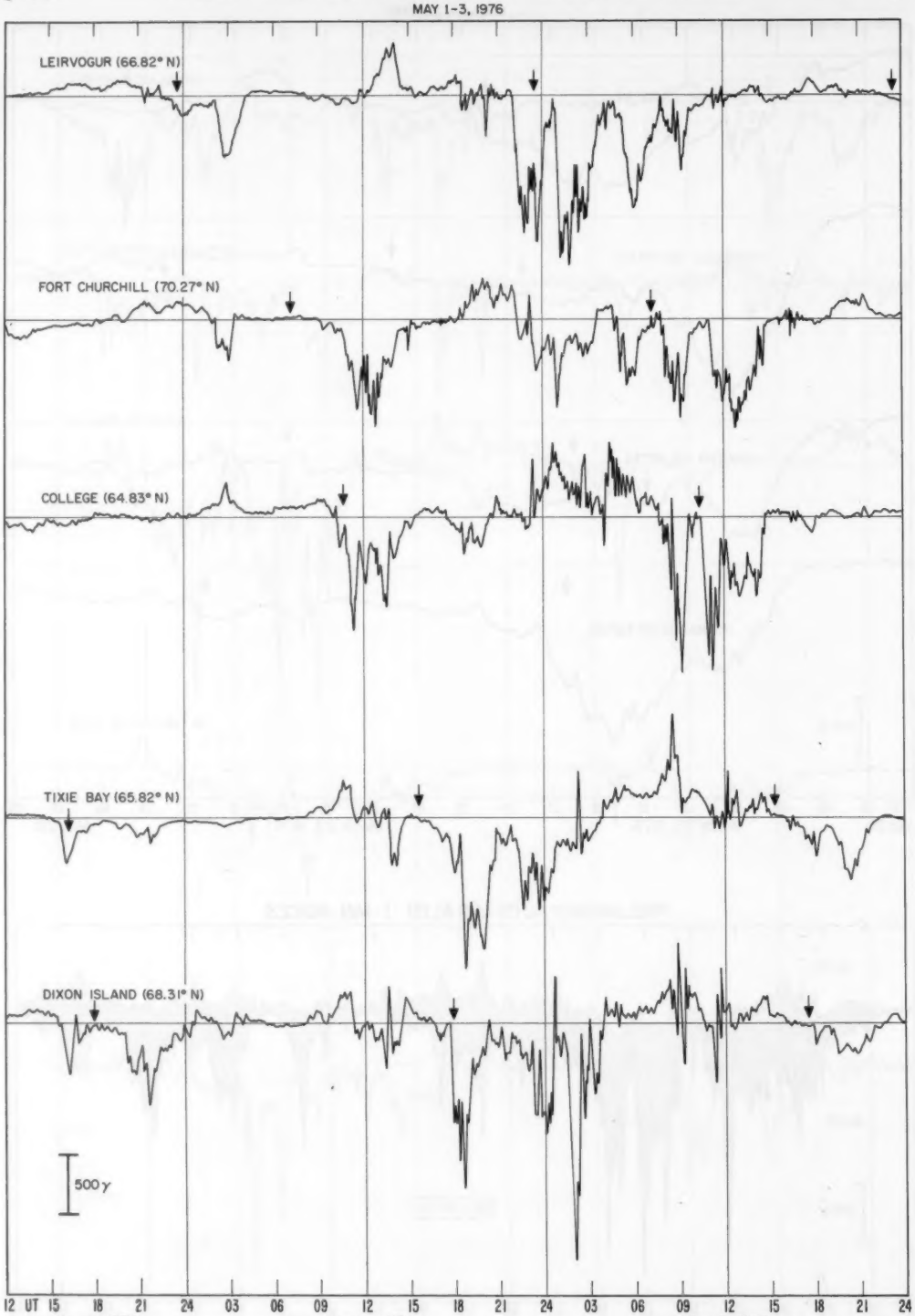



↓ Denotes Local Geomagnetic Midnight

Observatory latitude in Corrected Geomagnetic Coordinates

# H-COMPONENT MAGNETOGRAMS OF GEOMAGNETIC STORMS

MAY 1-3, 1976

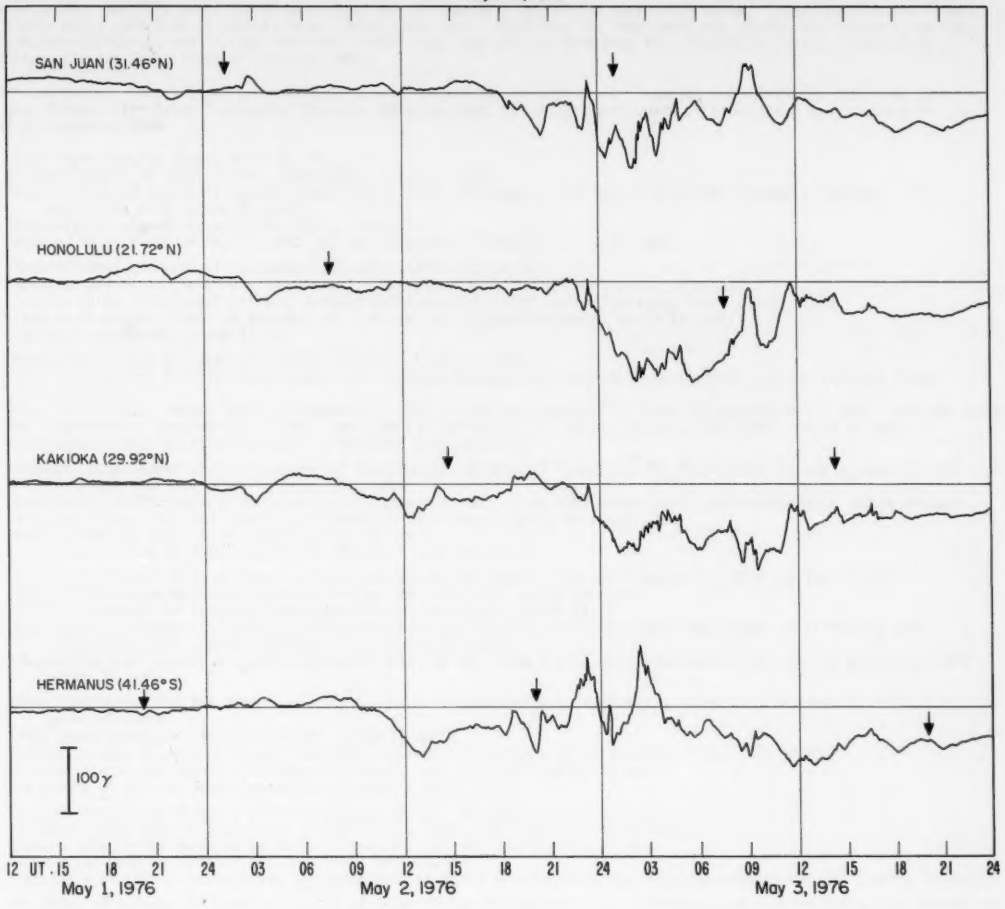



↓ Denotes Local Geomagnetic Midnight

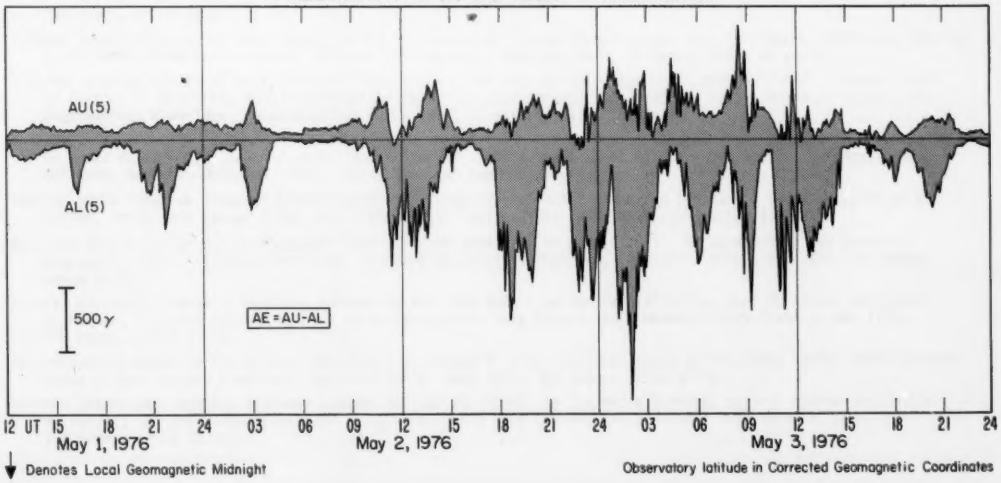
Observatory latitude in Corrected Geomagnetic Coordinates

## H-COMPONENT MAGNETOGRAMS OF GEOMAGNETIC STORMS

May 1-3, 1976




## PRELIMINARY AU (5) AND AL(5) 1-MIN. INDICES




↓ Denotes Local Geomagnetic Midnight

Observatory latitude in Corrected Geomagnetic Coordinates

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